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APRIL

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AMERICAN FRUIT GROWER

APRIL
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No. 4

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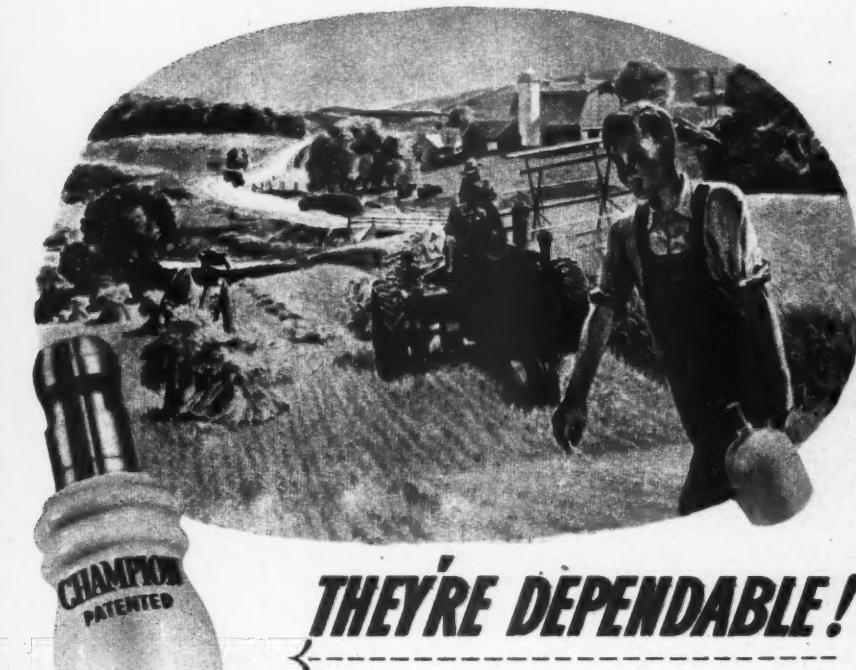
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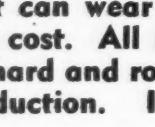
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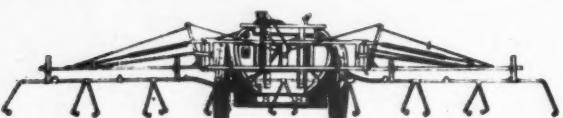


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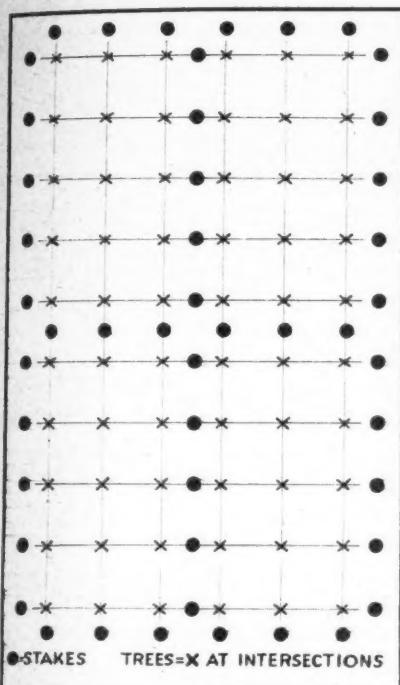
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LETTERS TO THE EDITOR

Planting Guide

Gentlemen:

In one of your issues three or four months ago (October, 1945) you had an article on staking out and setting a young orchard. While the article was excellent, very few commercial growers in this area use this method. The way it is done now is to square off your field just as you described in the article and then to measure, sight and place stakes where the circles are located on the enclosed diagram. When this is done the squaring stakes can be removed and all the trees can be set without moving a single stake. In setting the trees care should be taken to sight on the stakes only and not the trees themselves. This method is far superior to any other method I have ever seen used.



In a rather recent issue there was an article on 2-4-D for use in killing weeds in orchards. This material actually cannot be washed out of the sprayer and once used the tank cannot be used for spraying trees. A number of growers have learned this the hard way.

Rochester, New York Ralph G. Palmer

The method suggested here of staking out an orchard is much simpler and more commonly used than some of those mentioned in the October, 1945 issue, but space did not permit a listing of all methods now being used.

Growers should be cautioned about using their orchard sprayers for application of weed killers. Thorough washing does not always remove such materials as 2-4-D.—Editor.

Success with Blueberries

Dear Sir:

I was very much interested in Mr. Johnston's article regarding blueberries in Michigan (November, 1945 issue).

I had no luck at all with blueberries here (down near floor of Ohio River Valley, 19

miles S. E. of Cincinnati) until I used acid peat moss 50-50 in the soil and around roots. Later I used cottonseed meal as fertilizer and some plants made new canes 39 inches high during the '45 season. One plant produced forty-five clusters of berries $\frac{1}{4}$ to $\frac{3}{8}$ inches in diameter—four to 22 berries per cluster.

I am now increasing the planting to 50 bushes, including some newer, larger fruited varieties: Dixie, Stanley, Burlington and Weymouth. One plant mentioned above made two new canes about 37 inches high—each with three branches ten inches long at the top and they were a beautiful sight with their brownish red stalks and purple and red leaves from top to bottom.

Richmond, Ohio F. J. Watt

Since blueberry culture demands exacting soil and climatic requirements, few persons find success in growing this fruit. Thanks, Grower Watt, for passing along your experience with blueberries.—Ed.

Search for Old Varieties

Dear Sir:

The Smoky Mountain Club has a cabin in the Smoky Mountains. We are planting old-time mountain fruits around it. Can you tell me where I can get a Milam apple tree to add to our collection?

Knoxville, Tennessee W. M. Johnson
RFD 4

Dear Sir:

It must be a headache to you to have so many requests for old-time apple varieties, but I have tried every source I know of, trying to get scions of the following apples. I am using these in some experimental work on various dwarf rootstocks and would appreciate mention in your column so that someone might be able to furnish a few scions of these: Peck Pleasant, Pomme Grise, Swaar, Swazie, Louise, Early Joe, Shiawassee, Westfield Seek-No-Further.

200 E. 73rd Terrace
Kansas City 5, Missouri R. G. Anderson

Can any growers help these two seekers in their quest for the varieties mentioned above?—Ed.

The Himalaya Berry

Gentlemen:

I would like to hear what readers have to say about the Himalaya berry. I have only once seen this berry bush offered for sale and this was in a Tennessee nursery catalog which made wonderful claims for this berry being much superior to blackberries. They said it was suited as far north as our climate in Southern Indiana.

Information from our state experiment station said that they had never seen this berry north of Georgia and that it suffered the cold weather in that state.

Out of curiosity I ordered two plants and set them out in the spring of 1945. They grew vines 10 feet in length, and I protected them from winter injury with corn fodder stacked around them.

C. B. Risley

Like all of the evergreen blackberries, the Himalaya berry is not sufficiently hardy to be adapted for planting in sections where the winter is severe. Where the vines are protected they may come through the winter in a fair condition, but they are completely killed back in open winters.—Ed.

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APRIL

WHEN IS A "BERRY" NOT A BERRY? AND WHY?

By DAVID R. RODNEY, Ohio State University

It is surprising to most people when they first learn that some fruits commonly called "berries" are really, by definition, not berries.

According to the botanist, a fruit is a berry only when it is formed by the enlargement of the pistil, the parts of which remain fleshy and succulent when mature. In the light of this definition, where do our common, so-called "berries" stand?

Gooseberries, blueberries, and currants are berries. That is, the fruit is merely the enlarged ovary of the pistil. The seeds may or may not be hard and stony. However, the outer wall of the above fruits is derived from both the ovary wall and from the receptacle.

The strawberry is not a berry. The soft, fleshy part which we eat is not formed from the pistil but from the receptacle. The individual fruitlets of the pistil form the small hard seed-like structures that are imbedded in the surface of the fruit. This structure is then part fleshy and part hard.

What about blackberries and dewberries? They, too, cannot qualify as berries. In both the blackberry and dewberry, the fruit is composed of receptacle tissue in the center, covered with many little drupelets. This means that each small individual "globule" of the blackberry and dewberry is a drupe. In other words, it is a structure in which the inner part of the wall has formed a hard, stony layer around the seed, like a tiny peach or cherry. Therefore, all of the carpel wall is not soft and succulent; so the fruit is not a berry.

Raspberries, similarly, are composed of many little drupelets. However, they differ from blackberries in that the drupelets separate from the receptacle when mature and can be picked off in the form of a cap, the drupelets being held together by the interlocking of minute hairs. Being composed of drupelets, the raspberry, also, is not a berry.

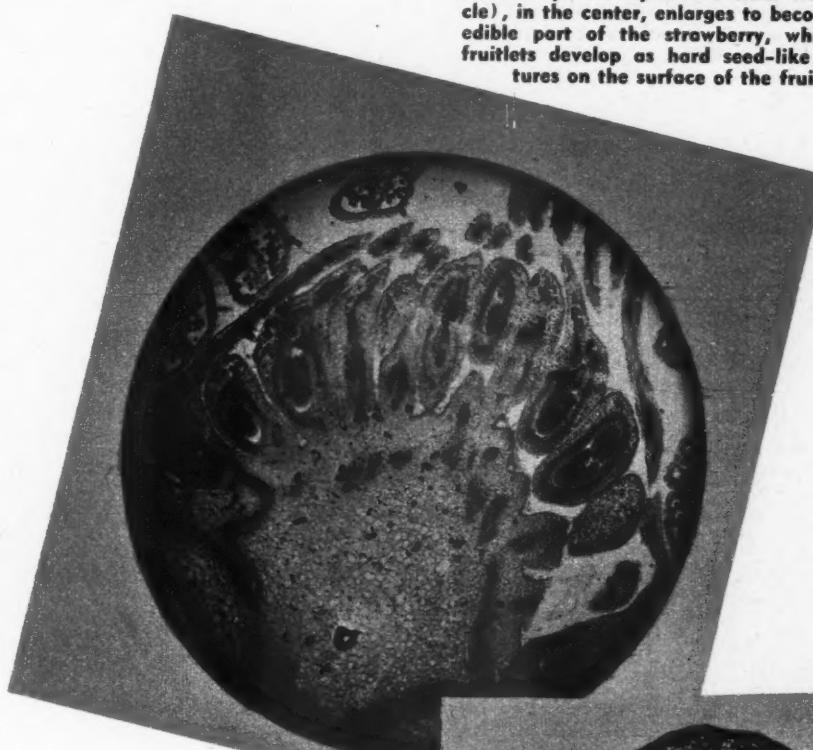
It is also interesting to note that some fruits which are not usually considered as berries, are constructed so that they meet all requirements of the definition. For example, the grape is a true berry. Each grape is simply

an enlarged ovary. The banana, with its peculiar shape and consistency, is a berry with an outer skin composed of receptacle tissue. Inside the skin is the soft, tasty portion which is the matured ovary. Even the tomato, although usually classed as a vegetable, is structurally a berry.

This doesn't mean that we should change the name of the strawberry,

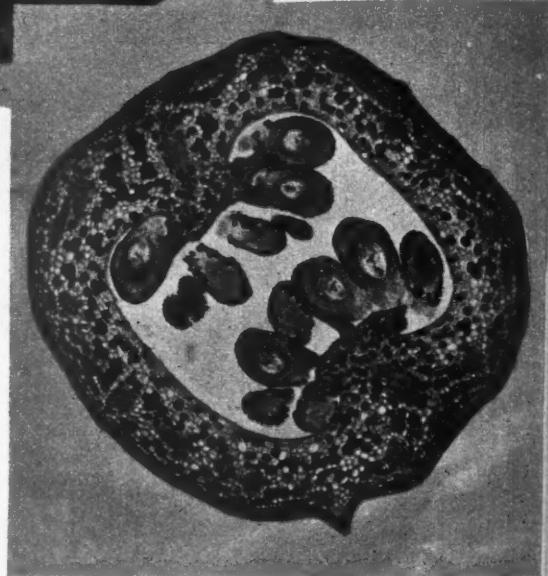


An enlarged sectional view of a young strawberry. The tip of the stem (receptacle), in the center, enlarges to become the edible part of the strawberry, while the fruitlets develop as hard seed-like structures on the surface of the fruit.



Above—An enlarged sectional view of a raspberry. The small drupelets cling together and form a cap over the receptacle from which they separate when mature.

Right—An enlarged cross-section of a gooseberry, showing the seeds attached to the inside of the ovary wall. The outermost layer is receptacle tissue.



nor that you could expect to get tomatoes in a market by asking for berries. It is just an interesting variation between our every-day talk and botanical language..

NEWER VARIETIES OF SMALL FRUITS

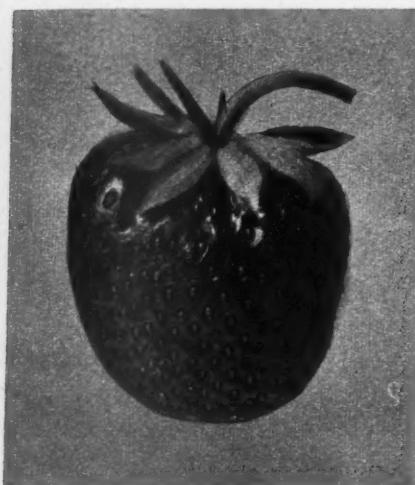
By GEORGE L. SLATE
New York Experiment Station

NEW strawberries are being produced at a rapid rate by experiment stations from Canada to Louisiana and Connecticut to Oregon. Most of these varieties are not widely adapted, having been developed under special local conditions. Generally it is not worthwhile to try these varieties under conditions materially different from those where they originated. As a general rule, varieties do not succeed more than a few hundred miles north or south of their place of origin. Southern varieties brought north are often unproductive and northern varieties moved south may be more susceptible to diseases than where they originated.

Of the newer varieties tested at Geneva, Sparkle, a product of the New Jersey Station, is the most promising. It starts ripening about a week later than Howard (Premier) and has much of the quality of its famous parent, Fairfax. The berries are firm, roundish conic and with a bright attractive appearance. The berries are sometimes not as large as is desirable, but the vigorous plants produce satisfactory crops. For those who may be plagued with the red stele root rot disease, Sparkle, which is very resistant, is first choice of all varieties.

Several other New Jersey originations are worthy of trial. Pathfinder, an early variety, also very resistant to red stele, is very productive of attractive bright red berries that are rather

The Dorsett, a cross of Howard 17 (Premier) x Royal Sovereign of England, is one of the best varieties in dessert quality.



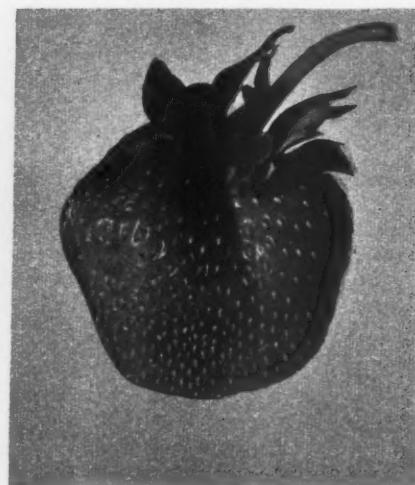
Maytime is the earliest high quality variety in Maryland but it is not very early or productive in New York State.

easily bruised and are only medium in quality. It is well worth trying in the northern states. Crimson Glow is a fine quality berry well worthwhile for home gardens in the New Jersey region. The strawberry breeding project of the United States Department of Agriculture has yielded many new strawberry varieties in recent years, and some of these, notably Blakemore, Fairfax and Dorsett, have become important and widely-grown sorts. Others are special-purpose varieties. Few of them are productive enough for the northern tier of states, but in the latitude of Maryland and southward they are well adapted and should be tested carefully. Several are high enough in quality to qualify them for the home garden.

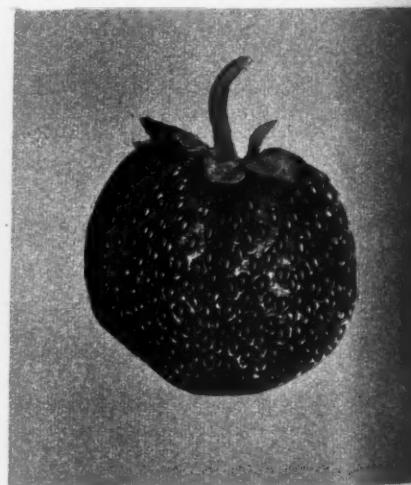
Midland is as early as Howard, very firm with a tough skin, fine qual-

ity and lighter in color than Fairfax. Although it is not very productive at Geneva, in one Hudson Valley planting it compares favorably with Howard in yield. It is worthy of trial in the northern states as well as in the latitude of Maryland. Starbright and Redstar are receiving much attention now. Both are very firm, tough skinned varieties of good quality and attractive appearance. As grown at Geneva they are somewhat deficient in plant making ability and are not sufficiently productive for market purposes. In the latitude of Maryland they are worthy of trial. Starbright ripens with Chesapeake, and Redstar is later, being one of the latest of all strawberries. Late varieties often encounter hotter and drier weather than

Fairpeake ripens late, is of medium vigor and has a tough skin.—Photo, Bureau of Plant Industry, U.S.D.A.



Redstar, one of the latest of all strawberries, is a firm, tough skinned variety of good quality and attractive appearance.



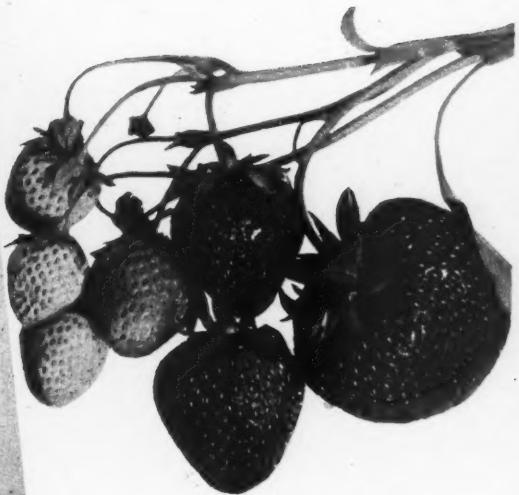


Blakemore is an early, firm, fine colored, commercial and preserving variety.

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Midland is very firm with a tough skin, fine quality and lighter in color than Fairfax. Photo—Bureau of Plant Industry, U.S.D.A.

the early sorts and irrigation should be available if the full benefits of their late ripening are to be obtained.

Maytime is the earliest high quality variety in Maryland but it is not very early or productive in New York. Northstar is a firm, attractive high quality variety that deserves trial in the home garden, but is a poor plant-maker and not productive enough for a market berry. Another high quality variety, Fairpeake, has been introduced for trial in the latitude of Maryland. It ripens late, is of medium vigor and has a tough skin. North Carolina growers should try Massey as a late high quality shipping variety.

Suwanee, the newest U. S. D. A. berry, makes its bow this year as a high quality berry for the South. It has been under trial at Geneva since

1937 and is by no means a poor berry, although it is far north of the region for which it was introduced. It ranks near the top in quality, which is unusual when we learn that it resulted from crossing Missionary and Howard 17 (Premier). The berries are of medium size, firm, and attractive and are borne on vigorous plants that usually make a good fruiting row.

The Maryland Station has introduced Temple, a cross between Aberdeen and Fairfax, as a red stele resistant variety to replace the susceptible varieties now being generally grown in that area where the red stele disease is sometimes a serious problem on poorly drained soils. It has not shown much promise on a one year test at Geneva, but should be considered for areas where red stele is serious.

For Tennessee growers their station has developed several varieties, Tennessee Beauty, Tennessee Shipper and Tennessee Supreme. The first-named is very productive and very firm at Geneva, but is unattractive in appearance and many berries have seedy tips. Tennessee Shipper is sour and poor in quality while Tennessee Supreme makes a poor fruiting row and is only fair in quality. These characteristics disqualify them for the northern states, but in Tennessee where they originated they perform much better and should be tested by the commercial growers of that area.

The Louisiana Station has done some noteworthy work in producing varieties resistant to leafspot and adapted to the strawberry growing regions of the far south. Already, Klonmore is being grown extensively for shipping to replace Klondike to which variety it is superior in appearance and quality. Konvoy, another



Suwanee makes its bow this year as a high quality berry for the South. Photo—Bureau of Plant Industry, U.S.D.A.



Temple—a red stele resistant variety. Photo—Bureau of Plant Industry, U.S.D.A.

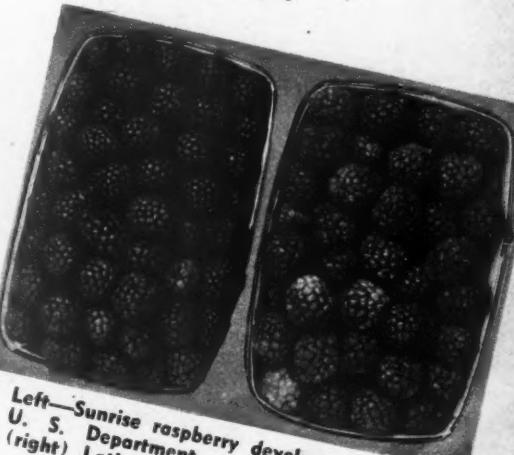
Louisiana origination, is suitable for freezing.

Minnesota growers have Burgundy, which is outstanding as a freezing variety, but not high in quality when eaten fresh. The Montana Station has recently named Montana Progressive, a seedling of Progressive that has shown high resistance to yellows.

(Continued on page 32)



Washington, a promising new red raspberry, is a production of the Western Washington Experiment Station, Puyallup, Washington.



Left—Sunrise raspberry developed by the U. S. Department of Agriculture and (right) Latham raspberry for comparison.

STRAWBERRIES— A Money-Making Crop

By ELDON S. BANTA



TOBACCO had been the life-line of farmers in western Kentucky for years and from all indications it was to remain so. But, by 1914 local and world conditions were pointing to a new trend. The poor, ill-managed land of this rolling country was becoming poorer. At the same time World War I closed the export market for Kentucky tobacco. The result was obvious, confusion and poverty among the rural population. But the citizens of the community around Paducah, Western Kentucky's largest city, were not content to sit idly by and permit circumstances to govern their lives.

On a memorable day in 1914 a group of progressive and influential business men of Paducah, Kentucky, gathered together a handful of farmers from the surrounding territory and traveled over to southern Illinois. Here they watched and questioned Illinois fruit growers about how they produced and marketed their fruits, particularly strawberries. They seemed to have a preconceived idea that here they could learn something that would help alleviate western Kentucky's agricultural troubles. They found just what they were looking for.

So in 1914 the McCracken County Growers Association was organized. It was established strictly on a cooperative basis and was to serve as the marketing agency for strawberries produced by the farmers of McCracken County, of which Paducah is the seat, and surrounding counties. The Association consisted of farmers only,

Below—Strawberries stacked and ready for shipment at Paducah, Kentucky. Each grower's lot is piled separately. (Below right)—Home of Ross Harris, which is typical of the well-painted homes of West Kentucky farmers. Strawberries have put the paint on many of these farm homes.



one year. This method gives continuity to the program of the Association. The officers and directors are elected at annual meetings of the Association.

The Association makes a fifteen cent brokerage charge per crate. This is paid by the buyer plus freight, the price of the berries and any other charges incurred. The fifteen cent brokerage fee is used to pay inspectors, employees, and to cover icing and

Left—Pickers harvesting the Tennessee Beauty strawberry in the patch of Leonard Overby of Mayfield, Ky. (Below)—Specialists examining the new Tennessee Shippert strawberry on the farm of J. H. Little are: (left to right) Joe Hurt, McCracken County Agent; H. E. Rothwell, Marshall County Agent; G. P. Summers, Field Agent in Marketing, University of Kentucky; C. E. Looney, County Agent, Crossville, Tenn.; W. W. Magill, Field Agent in Horticulture, University of Kentucky; Dr. N. D. Peacock, Chief, Horticulture Department, University of Tennessee; J. H. Little, owner of the strawberry patch.



as it still does. Membership is acquired by paying a dollar into the association.

As a member the grower can market as many berries through the Association as he desires with no additional cost to him.

The Association, now with some 3000 members, is directed by a president, secretary and treasurer and a board of 9 directors, all being grower-members. Three of the directors are elected for a term of 3 years, 3 for a term of 2 years and 3 for a period of

other charges that may be involved. As the grower's berries are received upon the platform they are marked with his name and Association number. Most berries come into the loading shed in Paducah between 4 and 9 o'clock in the evening. They are inspected, loaded onto the cars, iced and rolled out that same night or early the next morning. Most of them move north, about one-third going into Canada. An average car has a capacity of 1000 bushels.

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RASPBERRY GROWING IN WASHINGTON

The Fertile Soil of the Puyallup Valley
Is A Natural Site for Growing Raspberries

By JOHN C. SNYDER

Extension Horticulturist, Pullman, Washington

RASPBERRY growing is an important industry in the Puyallup Valley of western Washington. Here the industry extends from the Oregon line to British Columbia, but quite logically it centers around the fertile soil of the Puyallup Valley. The humid climate of the coastal area and the fertile soil of its valleys is particularly suited for raspberry growing. One need only see the tremendous cane growth to be convinced that this is a natural place for growing raspberries. Here the canes often reach a height of 10 to 15 feet. Of even more importance is the yields in this area, where six tons per acre is fairly common and 10 is not unusual.

Good Soil Most Profitable

Growing raspberries in Washington is not a new industry by any means. Raspberries were planted almost as soon as the area was cleared and settled. During these many years of producing raspberries, growers have learned many things about the business. They learned almost immediately that no land is too good for berries and that the best land is the cheapest in the long run.

It is only the inexperienced grower or the newcomer that plants raspber-



ries in poorly drained soil. Experienced growers have learned, in too many cases from bitter experience, that there is no substitute for good drainage. With moderate drainage, berries will often do fairly well until a particularly wet season comes along,

then out they go. John Harkoff, Jr. of Linden, Washington, is taking out 10 acres of berries this year because of poor drainage. Most growers are now of the opinion that even if you could get by indefinitely on poorly drained soil, you would make much more money on well-drained soil.

Raspberry Growing a Specialized Business

Raspberry growing is a highly specialized business in this area. Some growers grow raspberries and nothing else, except possibly some allied crop such as blackberries. The operations are by no means a hit-and-miss proposition. They are done with the greatest of precision and exactness. Methods of accomplishing results vary, but whatever is needed is spared in no way.

Planting and Training

The time of setting the plants has much to do with getting the planting started. Ordinarily the earlier the

(Continued on page 34)



Washington raspberry canes after pruning, showing how the canes in each hill are spread.

Washington raspberry canes after pruning, showing how weaving is done.

HOW TO CONTROL Insects and Diseases Of Small Fruits

By L. CARL KNORR, Michigan State College

ONCE a plant has been set out in the field, there are many troubles to which it may fall prey. These troubles can be divided into three groups: (1) the infectious diseases (those that are contagious like anthracnose or rust); (2) the non-infectious diseases (as for instance mechanical injuries such as whipping, or physiological disturbances such as might be brought on by drought); and (3) the insect injuries. The grower will have taken a long step toward controlling losses when he has determined in which group belongs the trouble that is affecting his plants.

The insects and diseases of small fruits are many. The presence of such trouble-makers, however, will vary both as to kind and amount with geographical location—and so also will measures for their control. In an article of this scope and brevity, even a few of the common troubles can be but little more than indicated. Further information, as befits local conditions, is given in the excellent publications listed at the end of this article; and it is suggested that small-fruits growers having disease or insect problems write for such bulletins as deal with their particular district or make further inquiries of their own local county agent.

Raspberry canes infected with crown gall.



Above—Young strawberry leaf roller, enlarged 25 times, showing the silvery web before the leaflet is rolled.

Left—A three-fourths grown larva of the strawberry leaf roller in a rolled leaflet which has been unrolled to show webbing.

Only rust-free nursery stock should be planted.

Powdery mildew: White mealy covering on leaves, causing them to roll, pucker, and become dwarfed. In most localities proper spacing will prevent establishment of mildew; in some localities, however, the application of sulfur may be required.

Spur blight: Large purplish, later gray, spots on canes at the base of buds. Control achieved by promoting air drainage and by spraying with 3-2-50 Bordeaux when plants are about 10 inches high.

Virus diseases: Troubles such as mosaic, leaf curl, yellows, and streak are grouped here. These cause symptoms of yellowing, mottling, misshapen leaves, and stunted bushes. Their control depends on the use of inspected nursery stock plus the roguing of any diseased plants in the field.

Aphids: Large plant lice with long appendages found during summer on the under surfaces of leaves near growing tips. Serious because they transmit virus diseases. Control effected by nicotine sulfate or pyrethrum.

Cane borers: Small long-horned black beetles feeding mostly on tender tips of canes and laying eggs in pith. Controlled by cutting out affected canes close to crown and burning.

Fruit worms (Raspberry beetles): Beetles about one-seventh inch in length, somewhat hairy, and light brown in color. Bud feeding and berry infestation both controlled by spraying with lead arsenate plus $\frac{1}{2}$ to

Raspberries and Blackberries

Anthracnose: Grayish spots with purplish borders on leaves and canes. Controlled by a single delayed dormant application of lime sulfur, 1-10.

Blue stem: Shedding of the leaves from the base upward, and development of bluish color in the canes. Caused by a soil-inhabiting fungus. Controlled by roguing infected bushes and planting healthy replacements in soil free of the pathogen.

Cane blight: Brown, dead areas often girdling and killing the canes. Control same as for anthracnose.

Crown gall: Fleshy tumors on infected roots and crowns. This is a soil-borne trouble and its control requires the planting of disease-free stock in disease-free soil.

Leaf spot: Similar to anthracnose, but the ash-gray spots contain pinpoint black fruiting bodies. Control is the same as for anthracnose.

Orange rust: A systemic fungous infection fruiting as reddish-orange pustules on lower surfaces of leaves. Since diseased plants never recover, they should be rogued before the occurrence of spread to healthy plants.

1 pound water.

Red-necked elms: Treated spraying.

Raspberries: Spiny leaves. pounds applied.

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1 pound casein spreader in 100 gallons water.

Red-necked cane borers: Red-necked or bronze-colored beetles causing elongated swellings on canes. Controlled by roguing affected plants and spraying with lead arsenate.

Raspberry saw flies: Small green, spiny larvae which often skeletonize leaves. Spraying with lead arsenate, 3 pounds to 100 gallons, will control if applied before blossoming.

Red spiders: Feeding of these small pale green or yellow mites on undersides of leaves may result in leaves turning yellow and developing a dry appearance. Spraying with 1% summer oil controls if applied following harvest.

Currants and Gooseberries

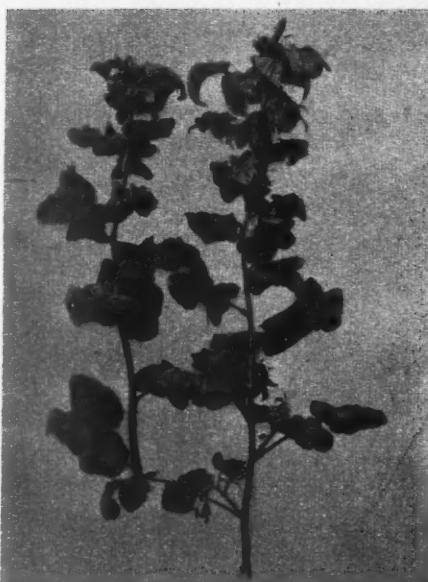
Anthracnose: Older leaves are attacked by this disease which causes

by small brown spots on both sides of the leaf, causing premature leaf dropping. Same control is effective as given for anthracnose.

Powdery mildew: Signs of this disease are the white mealy coating of unfolding leaves and the brown felt-like patches on the berries. One application of 1-50 lime sulfur will control if applied immediately after blossoming.

Aphids: Leaves affected by these plant lice become curled and distorted, with aphids gathering in the pocket-like cavities. Best controlled by killing aphid eggs with Elgetol or DN powder in oil during dormancy. Adults can be controlled with nicotine sulfate.

Currant borer: Yellow-banded black moths deposit eggs on canes, and after hatching the eggs give rise to borers that tunnel in the pith. Only control consists of keeping all old wood removed and in cutting out af-



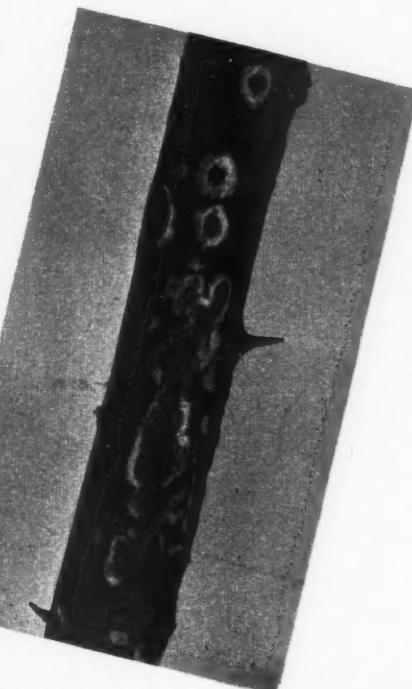
Leaf curl, virus disease, of the raspberry.

mal. Affected plants should be destroyed, and land not planted to strawberries for several years. Clean plants are prerequisite for a new disease-free start.

Leaf spot: Affected leaves show small, dead spots with brownish red borders and white centers. Only in severe infestations is spraying advisable, and then a 3-3-100 Bordeaux mixture will hold the disease in check. The variety Premier is particularly resistant.

Powdery mildew: A slight silvery cast to the lower surfaces of leaflets indicates presence of this disease. Upward curling of leaves and scorching soon follow. Not usually a disease of economic importance, but under conditions of severe attack Bordeaux mixture, 3-3-100 may be applied before leaf curling takes place.

Red stele: A relatively new disease
(Continued on page 38)



Raspberry cane infected with anthracnose.

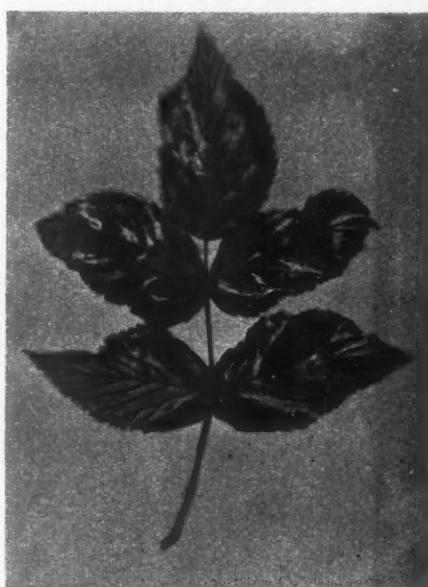
fected canes.

Imported currant worm: Blackish little sawflies with yellowish abdomens deposit eggs in rows along main veins on undersides of leaves, and the resulting small larvae eat small holes through the leaves. Spraying plants with lead arsenate, 3 pounds to 100 gallons, before fruit is set and again after harvest will give control.

San Jose scale: Scale-like incrustations on the canes. Controlled by a 2% dormant oil or by lime-sulfur, 11 gallons in water to make 100 gallons.

Strawberries

Dwarf (Crimp): A disease caused by bud-infesting, microscopically-small nematodes. Affected plants are dwarfed and the leaflets are small, narrow, and darker green than nor-



Raspberry infected with mosaic, a virus disease.

These canes show the stage at which the delayed dormant spray of lime sulfur should be applied on raspberries and blackberries.

small circular brown or black spots. Severely affected leaves yellow and drop. On canes, elongated spots may occur and on fruit flyspeck-like spots. Control can be obtained by spraying with 1-40 liquid lime sulfur of 5-5-50 Bordeaux mixture.

Blister rust: Pustules of two types appear on under surfaces of leaves: in early July small yellow ones, and later in the season those that are brownish and felt-like. Diseased plants should be defoliated, and the leaves burned. Currants and gooseberries should not be grown near valuable stands of 5-needed pines, since the same disease attacks both kinds of plants.

Leaf spot: A disease characterized



BREEDING SMALL FRUITS

By A. N. WILCOX, University of Minnesota

THE breeding of improved varieties of small fruits has produced important results. The leading varieties of strawberries, red, black and purple raspberries, currants, gooseberries and blueberries in the United States were developed by plant breeders. Such varieties constitute approximately three-fourths of the acreage devoted to small fruits. Nevertheless it is safe to say that small-fruit breeding is in its infancy, for there is still a great need for improved varieties with specific qualities, and the know-how to develop these varieties is already available.

Fruit breeding usually involves selection and hybridization, often with ingenious variations. Most of the small fruit varieties developed by breeders have arisen from crosses between varieties. By this method the Latham raspberry was developed at the University of Minnesota Fruit Breeding Farm. This variety not only reimbursed the people of Minnesota many times over for their entire investment in fruit breeding, but became the leading raspberry of North America.

In this method, parents are selected for the desirable qualities which the



Young strawberry seedlings descended through three generations of self-pollination from the Dunlap variety.

breeder seeks to bring together in a single new variety. These parents are cross-pollinated, the resulting seeds are planted, and the seedlings are carefully observed to select the few having the desired combinations of qualities. The perfect combination may be as rare as the perfect bridge hand. Consequently the breeder raises large numbers of seedlings, and tries to stack the cards by using parents with good breeding value as well

Strawberry seedling hills at the Minnesota Fruit Breeding Farm. Left row: a vigorous inbred line, Dunlap 3 generations selfed. Right row: a cross between Premier and a selected inbred line.

as good appearance. In the strawberry breeding program of the United States Department of Agriculture 170,000 seedlings were grown in developing seven varieties. These seven varieties came, however, from five fortunate crosses of which only 562 seedlings were grown.

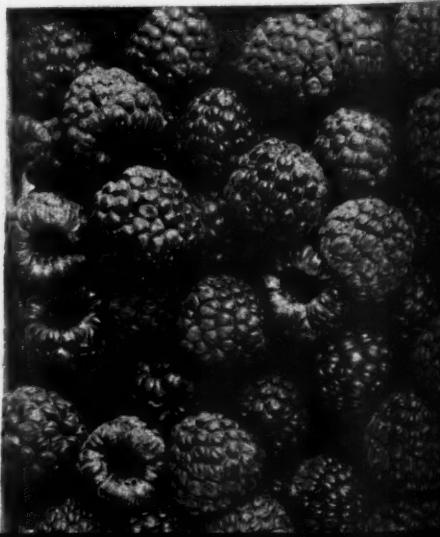
When it appears that commercial varieties are inadequate as potential parents, the breeder may turn to one or more wild species to obtain a desired quality, such as disease resistance, hardiness, or adaptability to certain climatic conditions. New varieties of strawberries for Alaska, California, and the Rocky Mountains have thus been developed by crossing commercial varieties with species growing wild in those regions. Extensive work is also under way to develop raspberry varieties for the South by crossing commercial varieties, which are unsuited to that region, with several Asiatic species that thrive under conditions similar to those found in our southern states.

This method of breeding is apt to require several generations of work in order to develop varieties that are commercially acceptable. Although it may be slower than the simple intercrossing of varieties, it may offer the possibility of greater progress in a given direction.

The well-known fact that fruit varieties generally do not come true from seed indicates one of the difficulties with which the fruit breeder has to contend. The horticultural value of a variety does not necessarily indicate the value of the variety as a parent. Consequently the fruit breeder usually makes a large number of crosses in order to find a few good ones, and even in these he raises a large number of offspring in order to assure success. How much he

(Continued on page 39)

The Latham red raspberry, developed from a cross of King x Loudon.



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Strawberry picking on a Tennessee Valley farm which has been restored with TVA phosphates. Once it grew 100 crates of berries an acre; now yields are as high as 400 crates an acre.



Strawberries are washed before freezing in a large perforated revolving cylinder.

PENNIES IN THEIR POCKETS

METHODS for quick-freezing fruits and vegetables, developed by TVA, are bringing new cash crops to Tennessee Valley farmers. Perishable products, once dumped on glutted markets at any price, are being frozen, stored, and gradually released as the market is able to absorb them.

TVA development of quick freezing was an outcome of its soil and flood control program. Diversified crops were needed so land subject to erosion could be planted in soil-holding crops. TVA began with strawberries. Their matted roots and foliage, and the straw laid over them, held water and soil; they bore abundantly in proportion to space. But they repaid growers only if they could be marketed after the harvest season. Quick freezing made that possible.

With University of Tennessee cooperation, TVA developed an air-blast process that froze berries in six minutes at zero. A demonstration plant on barges was set up. Trucks to haul, plants to store frozen fruit at zero were designed. Now there are in the Tennessee watershed 10 commercial freezing plants which buy from growers, thus providing perishable products markets that in some areas cover 11 months a year.

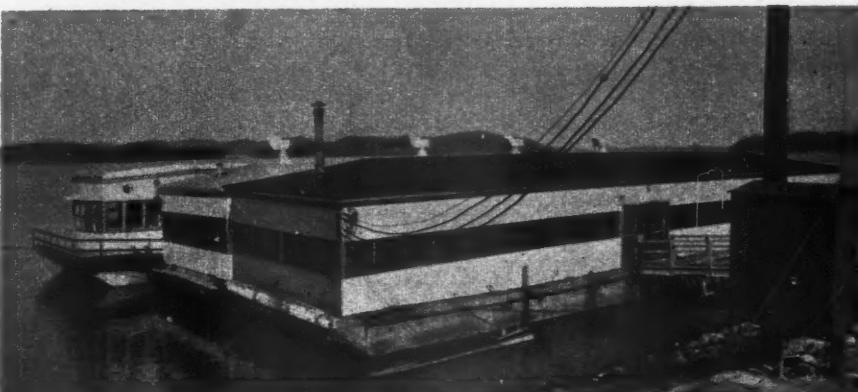
Here is the fast freezing pilot plant on barges operated by TVA on the arm of Watts Bar Lake at Spring City. The barge closest to the bank houses a machine shop for making and repairing equipment. In the middle is the processing plant; at the outside, the freezing and cold storage barge.

PHOTOS BY A. WITMAN
BLACK STAR



Above—From the washer, a conveyor belt carries berries past women who pick out poor fruit, leaves and foreign matter. Berries then fall into tray, to be mixed with sugar and put into containers with man in foreground.

Left—Cans of frozen strawberries are being stored at zero temperature.





Apricot Orchard in bloom at Roy, Utah.—Photo by Paul Tolm

NATIONWIDE FRUITS

APRICOTS

Fruit in Candy Bars

The research in developing fruit bars for the Army's famous K rations now may be turned to account by commercial and even home candy makers with benefit to candy eaters. This is the belief of W. V. Cruess of the Department of Agriculture, who was in charge of the research at the California Experiment Station.

Americans consume about 2 billion 50 million pounds of candy in a normal peacetime year—an average of about 16 pounds per capita, according to confectioners' estimates. Dr. Cruess says most of this candy contains no fruit, yet much of the candy is in bars which Army experience proved an ideal form in which to use dried fruit. Some of the ways in which fruit may be used in candy bars are:

Fondant Fruit Bar—One of the delicious bars developed by the California Station was made by warming

fondant to soften it, then mixing with ground dried apricots, figs, peaches, prunes and whole seedless raisins. This bar proved satisfactory for use in this country, but not for the Tropics because heat softens fondant.

Fruit Jelly Bar—For the Tropics a bar of stiff jelly was made with fruit pectin, corn sirup, sugar, fruit juice and ground dried fruit. When the jelly slabs were "set," they were cut in bars and coated with coarse sugar or shredded coconut to prevent a sticky surface.

Fudge Fruit Bar—Fudge also proved satisfactory as a binder for fruit bars for hot climates, because fudge does not soften in heat.

Fruit Tablets—The most unusual of all the candies was a fruit tablet made by compressing a mixture of powdered fruit with powdered corn sugar. Apricot, peach and prune powders were used. The tablets were similar to the familiar and popular old-fashioned mints.—USDA Daily Summary.

LEMONS

Lemon Storage Facts

This country's lemon crop presents storage problems, since most of the crop is harvested in the winter and spring, although the big market demand does not come until the following summer—June through August—according to the U. S. Department of Agriculture's research administration, which is helping to solve these problems. Annually 30,000 carloads of this fruit must be harvested and shipped, some of it after being stored for as long as 3 months.

Some of the practices followed in the storing and handling of the crop in the past have been largely a matter of custom based mostly on general experience. As a result of four years' work, investigators in the Bureau of Plant Industry, Soils, and Agricultural Engineering now have definite information on the subject which has just been published in Technical Bulletin 908, "Changes in Lemons During Storage as Affected by Air Circulation and Ventilation."

An important factor stressed in this report is the time at which lemons reach their "decay break," the time when alternaria rot is found affecting up to 3 percent of the fruit. One conclusion reached is that "light-green lemons picked in February did not reach their decay break until 6 weeks after those picked from the same

grove in May." Other conclusions are that lemons keep much longer in storage some years than others; that there is a close relation between the color of the "buttons" or stem stubs of lemons and the development of decay, which may occur after only a few weeks, or not until after many weeks. The author of the bulletin, E. M. Harvey, suggests a possible practical method of predicting the maximum safe storage period for any given lot of lemons by making several inspections of the buttons while the fruit is in storage.

The bulletin, T. B. 908, deals with several subjects, including handling the commercial crop of lemons, improving the keeping quality of stored lemons, loss of weight in lemons, and progressive changes in the fruit during storage. The bulletin, which should be of greatest interest to technicians in the lemon industry, may be obtained by them from the U. S. Department of Agriculture, Office of Information, Washington 25, D. C.

GRAPES

A \$500 Bunch of Grapes

Pictured on this page is the largest bunch of grapes known to the fruit industry, it being 41 inches long and weighing 39 pounds. At the rate of \$6 per pound—nothing unusual for this variety of grape—its value would be \$234. It was insured for \$500 and was brought to this country from Belgium by a well-known New York City importer of rare fruits. This bunch was not the product of an open vineyard, but was grown in a hothouse at Brussels, this being the only bunch left on the vine to develop. It is of the muscatel variety.

An average-size bunch of this variety would weigh about 1½-3 pounds. A small bunch, weighing 1½ pounds, is shown in the picture. The diameter

of a single grape of this giant bunch is about ¾-1 inch and the length is 1½ inches. This was regarded as the largest bunch of grapes ever grown in Europe.

The bunch was mounted on a float and shipped in a refrigerator on board the vessel, from which it was transferred to a specially iced truck and then placed in cold storage. After being exhibited in a glass case at various places in the city, it was finally destroyed when it began to decay.

When one looks at this bunch of grapes one recalls the story of the spies sent by the children of Israel to spy on the Promised Land, and who returned with clusters of grapes so large that it required several men to carry them. In Holland this variety of grape is known as the "Cannon Ball."—H. E. Zimmerman, Kansas City, Mo.

APPLES

Appraisement of Turley Apple

The Turley apple has been in production in Ohio for a sufficient period

of time to form an estimate as to its value, according to C. W. Ellenwood, of the Department of Horticulture of the Ohio Agricultural Experiment Station. Turley is a Winesap seedling and in tree and fruit characteristics it resembles both Stayman Winesap and Mammoth Black Twig.

The tree comes into bearing 7 or 8 years from planting and is very productive. Its fruit-setting characteristics are not so well known as are those of Stayman Winesap, but since it belongs to the Winesap group it is safer to plant it adjacent to varieties outside this group.

The fruit is medium in size, being about like Stayman Winesap or Mammoth Black Twig. The fruit is also of fair quality, which is as good as, or better than, Mammoth Black Twig but not as good as Stayman Winesap.

The fruit of Turley has shown no tendency to crack and in this respect it is superior to Stayman Winesap.

Any variety of apple requires a long period of trial before its commercial standing can be established but Turley would seem to rate at least a minor place in Ohio's list of winter varieties.



Above—Turley apple, a new variety, resembles Stayman Winesap and Mammoth Black Twig. Left—The largest bunch of grapes known to the fruit industry, weighed 39 lbs.



CHERRIES

Producing Dwarf Cherry Trees

The search on the part of the nursery industry for a method of producing dwarf cherry trees, both sour and sweet varieties, similar to the popular dwarf apple trees appears to be nearing a successful conclusion in the light of tests now going on at the Experiment Station at Geneva, New York.

(Continued on page 43)

After the **BLOSSOMS** fall, the **LEAVES** must go to work

FOR many years this company has pioneered through research and practical field work new and improved products for insect control. These products combine safely and effectively with other standard spray materials. Coupled with improved types of spray equipment, these products have enabled the grower to wage a more effective campaign against orchard enemies.

Black Leaf 155 programs are non-caustic. Repeated usage during the season protects foliage from devitalizing insect attack, conserves tree vigor,

insures a larger proportion of high quality fruit.

Both **Black Leaf 40** and **Black Leaf 155** have a wide acceptance in the codling moth control program. Usage of Black Leaf 40 in early cover sprays has been highly effective against adult moths—preventing egg laying, thus reducing later worm population.

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APRIL

HISTORY OF HORTICULTURE

REFLECTIONS OF MARSHALL P. WILDER ON THE A.P.S. CATALOGUE OF FRUITS

In keeping with the precedents set for the past two months, we are referring back to some of the early meetings and personalities of the American Pomological Society. The job now being done by the A.P.S., under the leadership of John T. Bregger, Chairman of the Variety Appraisal Committee, is again the kind of job which the A.P.S. is, by tradition, well qualified to do. This committee, in surveying the variety situation, has been getting excellent cooperation in collecting the information needed. That such a survey is urgently needed is beyond question.

The old catalog of fruits published by the A.P.S. was the outgrowth of widespread committee studies. Let's see what Marshall P. Wilder had to say at the session of 1885 held at Grand Rapids, Michigan. Mr. Wilder was not present but his report as president was read. Here, in part, is what he said about the work of the Society.

"When we reflect on the unsettled and chaotic condition of pomology in our country when our Society was established, the narrow limits to which fruit culture was confined, and the few engaged in it, and compare it with the immense territory now occupied for this purpose, and its importance as a great industry of our country, I think it may be well to take a retrospective view and see what our Society has accomplished.

"It's formation opened a new era of enterprise in the annals of American Pomology, which has no parallel in those of other lands. It was the first great national pomological society, embracing in its organization the largest area for fruit culture in the world, where almost every fruit of every zone may be grown in perfection.

"It has brought into close communion of interest, and concert of action, the most experienced and skillful pomologists of our country; and by its proceedings and publications has furnished examples and methods of work which have been adopted by other pomological and horticultural societies, all working

harmoniously together, and thus has become the acknowledged pomological authority of our land.

"It is truly an AMERICAN Society, having, through all the vicissitudes of the past, held in the bonds of friendly intercourse for the promotion of our cause, the North, East, West and the South, and every region where fruits can be grown on this continent.

"It has raised the standard of excellence by which our fruits are judged, discouraged the cultivation of inferior sorts, and thus educated the taste of the public for those of better quality, so that kinds once common in our markets have become obsolete, and are now considered unworthy of propagation. In doing this portion of its work, *it has discarded by general consent more than six hundred varieties*, either worthless or superseded by better sorts.

"It has established a uniform system of rules, by which fruits are to be shown and judged. But, what is of the highest importance, it has instituted a much needed reform in the nomenclature of fruits, by which all along, unpronounceable, indelicate, inappropriate, and superfluous words are to be suppressed in the dedication of our fruits.

"One of the grandest achievements of the Society is its Catalogue of

Fruits, published biennially, with isothermal divisions and columns for fifty States, Territories and districts, in which are recorded the fruits which may successfully be grown in those divisions, with stars to designate the merits and seasons of each. This is a work of great merit, and not attempted by any other society. And here let me say, that we should never forget how large a debt of gratitude we owe to Mr. P. Barry, as Chairman of the General Fruit Committee, for its compilation and classification. He has performed this duty for a long course of years; and fortunate indeed is it that we have, as his successor, his son, Mr. W. C. Barry, who has been so well educated for this duty.

"Few things in the history and progress of American Pomology have been more effective in the past and was more promising of valuable results in the future than our system of State reports. They embrace correct information from trustworthy persons, having special reference to the varieties most successfully grown; new kinds worthy of special notice; the chief obstacles to successful fruit culture in each district; and correct information in regard to the extent and progress of fruit culture in each section of our country, and are published under the supervision of the chairman of the General Fruit Committee of our Society, and contain a vast fund of information not elsewhere to be found . . .

"I cannot close my remarks on this subject without expressing the very great interest I feel in continuing this most important branch of our researches through generations to come, so that for all times we may have a system for the advancement of pomology, which shall be worthy of our nation and the great interests we represent. Had it done nothing else, this alone would entitle our Society to the universal approval which it now receives, and the gratitude of the generations which are to succeed us.

"To record all the good the American Pomological Society has accomplished would be equivalent to writing the history of American Pomology during the period of the Society's existence . . . It has organized and systematized everything pertaining to fruit culture, and has developed and elevated American Pomology. The Fruit Catalogue is a grand and glorious work, but far greater is the educational and refining influence which the Society exerts over its members. No one—unless he be irredeemably depraved—could attend its meetings without becoming not only a better pomologist, but also a better man and Christian."

AMERICAN POMOLOGICAL SOCIETY

Founded in 1848

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STRAWBERRIES—A MONEY-MAKING CROP

(Continued from page 12)

pacity of 420 24-quart crates. The Association normally ships through 4 points located in different sections of the area west of the Tennessee River. The largest of these is Paducah, the other three being Benton, Mayfield and Kevil.

When first started in 1914, the Association membership represented 31½ acres of strawberries. For 15 years it progressed and expanded steadily and in 1934, the peak year, 963 cars were shipped through the Association. This represented the production from 8,000 to 10,000 acres of strawberries in eight counties within the Kentucky boundary and west of the Tennessee River. This area is locally known as the Andrew Jackson Purchase area.

Due largely to the War and associated labor shortages, activities of the McCracken County Growers Association have been greatly reduced. The volume of berries grown and marketed through the Association is about one-fourth of that moved five years ago. Last year, 1945, less than 200 cars were shipped, representing less

than 2000 acres. This fact serves notice to the tremendous inroads made into plantings of some of our fruit crops as a direct result of recent war conditions. Strawberry plantings suffered as much or more than any other fruit crop.

Each grower is paid weekly for the berries he sells through the Association. Last year growers received the established ceiling price of \$7.80 per crate for all berries grading U.S. No. 1. The largest single day's shipment in 1945 was 16 cars on May 14. The salesman, who is the only paid member of the Association, receives 2 percent of the net sales.

Few farmers in the west Kentucky strawberry section raise more than 2 or 3 acres a year, most have about an acre. As previously noted, strawberries are one of a number of enterprises on the small farms. But the small plantings of berries are frequently the largest paying investments of the farmer, particularly at present. The McCracken County Growers Association is widely known in this country and Canada for its high-quality

pack. The painstaking efforts of the Association members and interested persons have been largely responsible for the successes achieved. Every grower is constantly on the alert for some practice that will both increase his yield of high-quality berries and improve the marketing methods of his Association.

Since the beginning days in 1914, a number of ideas have been put into practice which have paid dividends to the farmers and the Association. At first, the Aroma variety was planted one hundred percent, now it commands only about 15 percent of the

Through an active cooperative marketing association, improved cultural practices, and the will and determination that is naturally inherent among rural folk, the farmers of Western Kentucky have built a great strawberry industry. Though at present suffering from the war, future years will again find this section among the leading in the nation.

To W. W. Magill, Field Agent in Horticulture, University of Kentucky, goes much of the credit for the successful development of the industry. His keen understanding of the growers' problems, together with his helpful ideas have done much to pave the way for good strawberry production.—Editors.

DOWN ON THE FARM

by L. O. City



WELL, MAYBE YOU DID GET IT CHEAP AT A SURPLUS SALE, LEM... BUT IT'S A POOR SUBSTITUTE FOR A TRACTOR WITH B.F. GOODRICH TIRES!

There just isn't any substitute for the full traction you get from the open-center tread of B. F. Goodrich tractor tires. They get out of your tractor the full power that's built

into it. You can work faster and save on fuel with B. F. Goodrich tires. They're still scarce—but worth waiting for. Ask the B. F. Goodrich man to put your name on his preferred list.

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acreage. The chief variety now grown is Blakemore, an excellent shipping and freezing variety. Its qualities surpass the Aroma in many respects, especially in its high acre yield, firmness and good freezing qualities. It is not a perfect variety and so growers are alert to any new varieties that may be introduced for shipping.

A few years ago the University of Tennessee released three new strawberry varieties. Due to the foresight of Mr. W. W. Magill, Field Agent in Horticulture, University of Kentucky, plants of two of these varieties were brought to Kentucky for trial. These were the Tennessee Shipper and the Tennessee Beauty, which proved worthy of small plantings. Several acres are now planted to the Tennessee Shipper and a few to Tennessee Beauty. The majority of the growers are of the opinion that these new varieties will slightly out yield the Blakemore and Aroma and will hold up equally as well or better under shipment. The Beauty is somewhat sweeter than the Shipper variety. They may prove to be excellent varieties for freezing, but sufficient information on this characteristic is lacking at present.

Heavy fertilization of the soil is another practice profitably employed by Kentucky berry growers. Years ago when tobacco was the major crop, little commercial fertilizer was used. But

(Continued on page 28)

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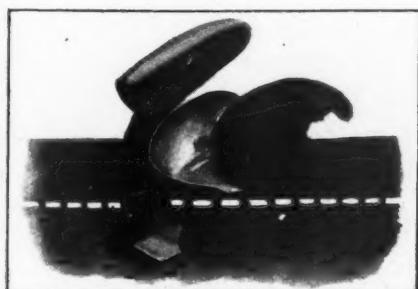
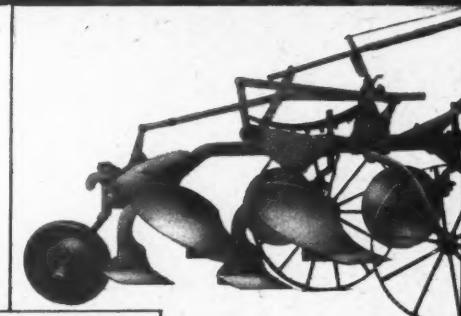
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Now you can plow and break up the root-retarding plow pan beneath the furrow in a single operation—without bringing sterile subsoil to the surface. OLIVER's new TNT Plow turns the top-soil in the usual way. But, in addition, it loosens the subsoil to an adjustable depth of 4 inches.

For the first time, here's a plow that combines all the advantages of the conventional moldboard with the extra benefits that come from breaking up plant-blocking plow pan and the colloidal silt layer below your normal plowing depth.

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Your profits in bigger yields will pay for an OLIVER "TNT"—many times over. Extensive tests have proved that deeper tillage by the new OLIVER TNT Plow provides better soil aeration . . . materially aids moisture absorption and conservation . . . reduces rainfall run-off . . . helps conserve precious organic matter . . . facilitates root development . . . makes plant food more readily available to fast-growing crops. And, with every plowing, the "working capital" of the topsoil is gradually increased through marginal mixing of the subsoil with the humus-packed top layer—from the bottom up!



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**CONTROL INSECT PESTS
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From the Pest Control Laboratories of Du Pont, here are products designed to do one job and do it well—to help you Help Yourself to Better Crops.

For the protection of practically every crop—for control of insect pests in orchards, fields, buildings and on livestock—there's a Du Pont product to meet your needs.

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DEENATE DDT
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To effectively control insect pests on fruit, vegetables, field crops and livestock as well as in farm buildings, you need DDT in different forms. That's because it's the DDT residue—the coating that remains after application—that kills insects and keeps on killing them as they come.

Du Pont "DEENATE" DDT gives you a choice of DDT in five different forms—wettable powders and emulsifiable oils for spraying and other formulations for dusting.

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2,4-D WEED KILLER

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This new, selective weed killer kills many weeds in pastures, lawns and fields when properly used. Effectively kills annual morning glory, bull thistle, giant and common ragweed, mustards (all species), annual sow thistle, sumac, locust, dandelions, chick weed and many other common farm weeds. Tests also show promise for control of bindweed. See your local agricultural authorities for recommended use.

AMMATE
TRADE MARK
Weed Killer

Still the outstanding weed killer for poison ivy, poison oak, choke cherry and many other woody perennials; also for brush and second growth.

PARMONE
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Fruit Drop Inhibitor

Controls pre-harvest drop. Gives apples and pears time for development of maximum color, quality and size. Cuts spot picking and cull losses. Available for dust, water or oil applications.

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THROUGH CHEMISTRY

Yield to Better Crops!

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Outstanding control of brown rot on peaches, of early blight of potatoes as well as diseases of tomatoes, celery, beans and other vegetables. Combined with "DEENATE" DDT, it makes an unusually effective disease and insect control.

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A non-caustic fungicide, non-russetting on apples and pears. Favored by many growers for use on apples, pears, cherries, cranberries, celery, tomatoes, beans and other crops. Effective against many diseases and safe on a wide range of plants. Use as a spray or dust. Compatible with most insecticides.

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Dinitro Spray

An effective water-soluble Dinitro spray for orchard crops, small fruits and ornamentals. Both a fungicide and insecticide for a number of diseases and insects. Also effective as early ground cover spray for scab control.

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NEWS

INDIANA—At a recent meeting of the managers and growers of strawberry shipping associations, some of the newer varieties were discussed by growers.

Tennessee Shipper will be discarded by several growers because of low yields and quality. Growers report this variety very sour.

Tennessee Beauty seems to be a very good variety under southern Indiana conditions and yields double that of Aroma were reported. It is a high quality berry, attractive, and a good shipper. Growers believe it will expand in acreage.

Supreme, under our conditions, is a large soft berry that has no place as a shipping variety.

Labor conditions are still tight in southern Indiana and growers expect not more than a 10 percent increase in 1946 plantings. Some old growers may get back in the strawberry business which could change the picture somewhat.

From 60 to 80 percent of the 1946 crop will be harvested from one-year-old patches and all reports showed them to be in very good condition. With a favorable spring, Indiana strawberry production should be up or at least better than 1945.—*K. I. Fawcett, Sec'y, Indiana Horticultural Society, Lafayette.*

IDAHO—The new officers for 1947 elected at the Fifty-first Meeting of the Idaho State Horticultural Society are: Robert Mc Birney, Boise, President; George Yost, Emmett, Vice-President; and Harold Davidson, Nampa, Secretary-Treasurer.

Among the program features at the society's annual meeting in February was a picture shown in technicolor on the subject of "Rearing of Parasites to Combat Oriental Fruit Moth."

As was true at many society meetings, the subject of DDT was of great interest at the Idaho meeting. Dr. W. E. Shull, Head, Department of Entomology, University of Idaho, talked on the "Use of DDT in Fruit Insect Control."—*A. Harold Davidson, Sec'y, Idaho State Horticultural Ass'n., Nampa.*

MAINE—Two new packs of cellophane-wrapped Maine apples went on "trial" in the Portland, Maine, area on March 5th to win a "judgment of approval" from the fruit industry's staunchest supporter—the housewife.

A one week test was given the transparent packs to determine if they meet consumer preferences and to provide research data for further development in apple packaging in the future.

The types used in the "experiment" were selected after considerable study of packages and containers by the Maine Agricultural Experiment Station in cooperation with the Maine Fruit Producers, Inc., the Maine Pomological Society and the State Department of Agriculture.

Dr. Charles H. Merchant, Head, Agricultural Economics, Experiment Station, stressed that the project was "not a scheme to sell apples but an honest attempt by the Maine Apple Industry to see what types of packages will completely satisfy the consuming public."

Dr. Merchant stressed the emphasis now being placed on prepackaging of foods

formerly sold in bulk and declared that the Maine apple growers would be in the "forefront" of this movement.

Some of the advantages of the new cellophane-wrapped apple packs include visibility of product, convenience in handling, sanitation, freedom from handling, more uniformity in size and quality—all this at little additional cost to the consumer, he emphasized.

This experiment was conducted in only four stores in the Portland area due to the extremely short crop of apples the past season.

Streamlined postal card questionnaires were handed to purchasers of these pre-packaged apples to be filled out at their convenience and returned to the Agricultural Experiment Station for analysis. Results of this experiment have not yet been released.

WASHINGTON—At a clinic held at Washington State College, Pullman, Washington, by the Division of Industrial Research, future uses for aluminum and other light metals were exhibited and discussed by experts, including Dr. Nathaniel Engle, Head of the Bureau of Economic Research, University of Washington, who has conducted extensive market research in light metals.

Among the experimental suggestions appeared the story of research on the use of aluminum foil for the wrapping of apples. For a cost that will average 15 cents a box it is claimed that apples can be preserved for 30 days or longer. Apples were not the only fruit, however, for which the aluminum foil industry has postwar plans. Oranges, grapefruit, peaches, pears, and kumquats are all slated to be wrapped in the gleaming silvery colored foil if the light metal fabricators have their way.

The statement was made that the Washington apple industry alone could absorb 25 million pounds of aluminum foil annually. For those who think this too extreme a figure, it may be pointed out that the Hershey

Company uses somewhere around 8 million pounds of foil in a year.—*Golda Stevens Kaufman.*

OHIO—The time was when insect pest control on Ohio farms was considered a minor, but necessary, evil. Now it has taken its place among the other basic items of production, such as proper nutrition of plants and animals, varietal and breed improvement, better marketing and managing techniques, and others.

"The insects themselves have forced this recognition," said J. S. Houser, Chief of the Department of Entomology of the Ohio Agricultural Experiment Station, in a recent broadcast which reviewed the progress in insect control in Ohio during the last 40 years. When considered in all of its aspects, the problem has become 10 times as acute as it was at the beginning of the 40-year period.

By foresight in planning and by utilizing the many new procedures now available for the control of insect pests, otherwise serious losses may be much reduced.

FLORIDA—To obtain a larger loan than the entire value of a grove a few years ago is financially risky business, Zach Savage, Extension Service economist, advises prospective citrus grove buyers.

"The borrower in such a case," Mr. Savage explains, "would be in a very difficult situation if the value of the grove declined drastically before the debt was liquidated."

Heavy demand and big crops during the war resulted in an increase in returns from fruit during the past three seasons of 332 percent over the previous 10 seasons, he points out, and this abnormal condition has produced a tremendous boost to grove valuations. "The same relationship is not maintained year after year between the net income from the sale value of citrus groves, however," he warns. "Since 1940 many groves have doubled in their sale value. Between 1941 and 1944 the income from groves on which we keep records increased more than 700 percent. Should net income

(Continued on page 43)

LESSONS IN ORCHARD CHEMISTRY

By E. D. WITMAN, Research Associate
Ohio State University Research Foundation

THE "INSOLUBLE" COPPERS

In an attempt to overcome some of the disadvantages of bordeaux mixture, a group of chemicals known as the "insoluble" coppers have been developed. They are chemically quite different, being alike only in that they all contain copper in a substantially water-insoluble state. Some are oxides or hydrated oxides of copper; some are insoluble salts of copper; and some are basic salts of copper. They may be applied either as sprays or as dusts, with or without lime, as conditions dictate.

The oxides, hydroxides, and basic salts are generally made by treating soluble salts with varying quantities of bases, such as lime, soda ash, caustic soda, etc., separating the insoluble solids which are washed, dried, and ground to fine powders. Among these compounds are red and yellow copper (cuprous) oxides, Cu_2O , which differ from each other only in particle size; blue and brown copper hydroxide, $Cu(OH)_2$, which differ in combined water content; basic copper chloride, or copper oxychloride, $CuOCl$; basic copper sulfate, $CuSO_4 \cdot 3Cu(OH)_2 \cdot X \cdot H_2O$; basic copper arsenate, $CuCuOHAsO_4$; and others. The last three compounds are examples of basic salts.

Examples of insoluble copper salts are copper phosphate, $Cu_3(PO_4)_2$; copper silicate, copper zeolite, etc. The chemical nature of the last two are very complex. Such products are made by treating soluble copper salts such as copper sulfate with solutions of trisodium phosphate, sodium silicate, etc. The insoluble salts are then separated, washed, dried, and pulverized.

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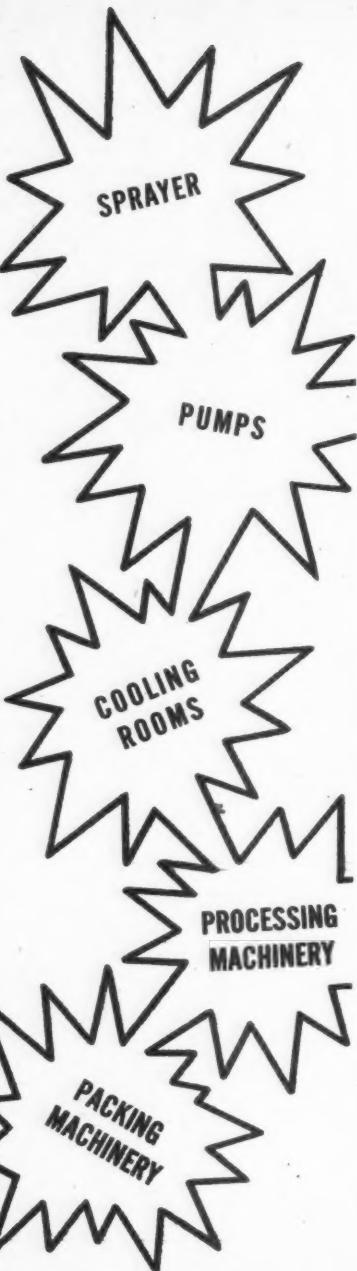
Your veteran sprayer takes a new lease on life with the installation of an Allis-Chalmers power unit. Also on pumps, in cooling rooms and on processing and packing machinery these dependable units are going to work making money.

Every orchardist, large or small, can select an Allis-Chalmers power unit ideal in price and capacity for his operation. Their five sizes range from 15 to 110 brake h. p.

There's immediate satisfaction in the famous hair-trigger governor action you find in these engines...and long-time satisfaction in such features as replaceable wet-sleeve cylinders.

Consult your Allis-Chalmers dealer about the spot power you need. He's the man well qualified and equipped to assure your getting long life and maximum service from your power unit.

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STRAWBERRIES—A MONEY-MAKING CROP

(Continued from page 22)

with the advent of strawberry production, heavy applications of superphosphate and other fertilizers were made. Phosphate has given greatest increases in yield of strawberries on western Kentucky soils. Nitrogen and potash have failed to give any appreciable increase in yield of berries when applied directly to the plants. Present rates of application of 20 percent superphosphate in this area vary from 500 to 1500 pounds per acre. Some growers split their applications, applying some before setting the plants and then making two or three hand applications later in the season. Due to the relative stable condition of phosphate, the most efficient practice is to apply all the material just before setting the plants and discing it into the soil. When applied to the soil surface little of the phosphate is available to the roots a few inches below. The former is the method recommended by the University of Kentucky and Extension Service when used on strawberries.

Planting Practices

Plowing under good green manure crops just before planting is another soil improvement practice followed by western Kentucky's berry growers. Balbo rye, a rank growing type, sown in the fall and plowed under in the spring when it is about 12 or 15 inches tall makes an excellent green manure crop. Sweet clover is also used but requires liming, since the soil is acid in reaction. Application of 200 pounds of lime per acre is sufficient to give a good stand of sweet clover. Field peas, soy beans, vetch, and crimson clover are among other plants used for soil building purposes.

Soil Drainage Poor

Drainage of the soil is poor in parts of this area due to a hard-pan just below plow-depth. For this reason the berry plants are set on slight ridges from 4 to 6 inches high, and are kept ridged up. This gives the soil a chance to drain well around the roots of the plants. During a wet season, as last spring, this is especially important since water will stand in the fields for a week or more at a time before it can settle away or evaporate. The extreme western portion, near the Mississippi River does not have this hard-pan so near the soil surface and the soil is better drained.

Growers like to get their new plantings made by the last week in February or the first week of March. Tobacco has been found to be the best crop

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to precede strawberries in Kentucky, for two reasons. First, tobacco plantings are kept free from weeds, and second, rather heavy fertilizer applications are made to the tobacco crops. There is thus some residual effect of this heavy fertilizer application which is beneficial to the strawberries. During the first growing season the berry planting is cultivated 6 or 7 times and hoed frequently to keep down weeds.

Planting Distances

Planting distances vary considerably, depending upon the grower's individual desires. Some are planted 3 feet apart in rows 4 feet apart. All runners from each plant are encouraged to root and form the productive plants for the following year. Growers using this system state that it produces more large berries and better plants and also maintains a satisfactory yield. Many growers follow the matted row system with favorable results, the rows being from 3 to 4 feet apart. The method of spacing plants may also be partly determined by the variety grown. The new Tennessee varieties seem to do better when set farther apart in the row, from 2 to 3 feet. This is the experience of those growers who have given them a trial. The Aroma and Blakemore are largely grown in the matted row system.

Mulching

Straw mulch applied in early winter is a practice now almost universal with Kentucky growers. About 1½ tons of straw per acre is the usual practice, with some using 2 tons or better.

Strawberry plantings of the Jackson Purchase area have been kept in continuous production for 2 or 3 years and some for 4 years. This is largely due to the short labor supply available for starting the new plantings each year. Normally, 2 years is the duration of a planting. After harvest the planting is "worked-out," or renewed. This is done by thoroughly cultivating the middles. A "rastus," a one-horse cultivator with 3 double shovels, is most commonly employed for this purpose. Older patches are sometimes cultivated across the rows in order to break up the matted rows and provide better soil conditions for plant renewal. Rows are narrowed down to 8 or 10 inches in width from which new plants are formed.

Harvesting

Last year most of the berries were picked by school children and women living within or near the area. A few pickers were brought in from the South in only a few cases. Good pickers averaged around five crates a day

(Continued on page 31)



We beaten the build-up -

"I'm strong for theory, but in spraying I'm all for practice. Take codling moth and red mite control, for instance. A few years ago these pests were building up rapidly against our accepted spray practice. Then we strengthened up with ORTHOL-K and Black Leaf '40' and Black Leaf '155'. Looks like they've taken the count for keeps now — thanks to the help given us by our ORTHO fieldman."

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SMOTHERS EGGS
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FRUIT GROWING IN A MOUNTAIN AREA



This recently-terraced orchard site is only the beginning of what can be done to develop a thriving fruit industry in the lower mountain area of Bernalillo County, New Mexico.

By WINIFRED SNYDER

C. B. SANCHEZ, secretary of the Sedillo Soil Conservation District in New Mexico, believes that Bernalillo County's mountain farmers can develop a profitable fruit growing industry if proper equipment is made available to them. Furthermore, experts contend that what Mr. Sanchez has learned about fruit growing in the Bernalillo mountain area would apply equally well to most of the other mountain country in the northern part of the state of New Mexico.

"Orchards, that would provide the best steady cash crop the farmers ever have known, could be grown in the lower Sandias," Mr. Sanchez said. He spoke from 20 years of experience with his own six-acre orchard in the lower mountain area near Carnuel.

He has just leveled four more acres for planting new trees.

Soil Conditions Good

"Fruit crops thrive here because air drainage prevents early freezes, the trees stay dormant longer in the spring because of the higher altitude, and the soil conditions make it a natural habitat for fruit," he said.

Terracing and leveling, however, would be absolutely essential to the growth of orchards in the region; and equipment for this would be necessary, Sanchez added.

"If all cultivated lands of the Seditto District, and especially the irrigated land, could be leveled and

"bench terraced, there is no question that better crops, as well as good orchards, could be grown," is Mr. Sanchez's opinion.

Surplus Machines Necessary

"Farmers in the area are not economically prepared to hire contractors to do this leveling, but if the government were to turn some of the earth-moving equipment used by the Army over to the Sedillo District, it could be used on a cooperative basis," he said.

"The productivity of this area would be so much greater with proper equipment to level and terrace the land that it would be well worth the Government's effort in turning one or two machines over to us," Sanchez observed.

Apples Bigger and Better

Apples Bigger and Better
Apples grown in the area, he added, weigh from three to four pounds more per bushel, bring a higher price per pound, and their color is 50 percent deeper than valley apples. Two fruit trees would bring the farmer more than an acre of beans.

"Peach trees in the mountain area grow as big as apple trees and don't dry up after about 10 years as do valley trees."

Cash income from the orchards would greatly raise the standard of living of the mountain area whose 200 families average less than \$300 a year in their cash income from all sources, Sanchez concluded.—From *New Mexico Extension News*.

STRAWBERRIES—A MONEY-MAKING CROP

Continued from page 29)

and were paid 5 cents a quart or \$1.20 per crate. Where competent, well-trained pickers were employed, the berries were packed into the crates directly from the field, otherwise they were hand-sorted before packing. A small 3-sided building in the strawberry field serves as the packing shed.

Crop Yields

The yield of strawberries in this section of Kentucky varies considerably, due to varying degrees of soil fertility and texture and different cultural practice. The average yield for the entire section is around 50 crates per acre with many getting 100 or more per acre. Ten percent of the growers average from 200 to 300 crates per acre. Only a few patches were reaching these high yields this year due to the unfavorable spring weather for fruit development.

Small and overripe berries are purchased by a local concern for freezing. Towards the end of the picking season most of the berries go for processing, very few being of high enough quality to meet U.S. 1 grade.

Quick Freezing

The future seems promising for the berry growers of western Kentucky. Prices may not always remain as high as at present, but there are other things which will make berry production interesting and profitable. Quick-freezing probably holds one of the greatest future developments. A new freezing-processing plant is now in operation in Paducah which will in future years consume great quantities of off-sized and misshapen berries as well as number one berries.

Cooperative Marketing

The cooperative marketing association is the key to the entire berry industry of western Kentucky. No single grower produces berries enough for rail shipment, nor is there any large local market for them. Consequently he must depend almost entirely upon his association for marketing his berries. As long as it operates upon cooperative principles it can serve him to advantage. For this reason the grower members of the McCracken County Growers Association are constantly on the alert for those ideas and practices which shall improve and broaden their industry. A good quality berry, properly packed and shipped, has been their successful goal.



WHETHER you've got an order in for a new tractor, or plan to carry on with the equipment you have, you can be sure of one thing: the better care you give your equipment, the better service you're bound to get from it.

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GRAPE BERRY MOTH
GRAPE LEAFHOPPER

GESAROL* AK 50 (50% Geigy DDT) used at the rate of $1\frac{1}{2}$ to 2 lbs. per 100 gals. of water will do an excellent control job on both of the above pests. 3 sprayings are required: First—Just after bloom; Second—10 days later; Third—Just before berries touch each other.

Where grape leafhopper is the main pest to combat use:

GESAROL AK 50 at $1\frac{1}{2}$ lbs. to 100 gals. of water in a pre-bloom or post-bloom spray. This usually affords good seasonal control.

GESAROL VD 50 (50% Geigy DDT) extended to give a 3 or 5% DDT dust will also do a good job in one or two applications.

In the all important matter of pest control, play safe—Use Geigy DDT compositions in accordance with Geigy proven methods. To get best results in using DDT, get your facts from the source.

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NEWER VARIETIES OF SMALL FRUITS

(Continued from page 11)

On the Pacific Coast, strawberry breeders are actively engaged in breeding better varieties. Oregon has sent out the Brightmore variety for trial. At Geneva it set a very heavy crop, but with rather scant foliage to mature the berries which were probably lower in quality than if the plants had sufficient leaf area. The skin was tough and the berries handsome. The variety is at least worth watching in New York.

The California Station has introduced five new sorts recently for trial in that state. They are Shasta, Sierra, Lassen, Tahoe, and Donner. They have not been tested in New York.

Among those that fell by the wayside are Paymaster and Robinson. Both are low in quality, bruise easily, and are generally inferior to many of the varieties now being grown extensively.

Raspberry Varieties

Practically all of the good red raspberry varieties of the country, except Cuthbert, have come from the breeding programs of the experiment stations and United States Department of Agriculture. The work is continuing and eventually the present day varieties will give way to others. One of the newest is Milton from the Geneva Station. Resulting from a cross between Newburgh and Lloyd George, the variety has the ability to escape mosaic infection that is found in some, but not all, seedlings of Lloyd George. Large size, firmness, good quality and late ripening are other characteristics of the variety. The plants are as vigorous as any and crop well.

Freezing Varieties

The Oregon Station made the same cross and produced Willamette, which is now being tried in that state where it appears promising. At Geneva the plants are vigorous, but the berries are darker than is desired for New York markets. They are very large, firm, and of good quality. Both Willamette and Milton are among the best for freezing as determined by tests at Geneva.

A promising new red variety that has already demonstrated its merits in the state where it originated is Washington, a production of the Western Washington Experiment Station, Puyallup. Already 1500 acres have been planted in Washington. Resulting from a cross between Lloyd George and Cuthbert, this promising variety has much of the Cuthbert quality combined with larger

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size and brighter color. The plants are very vigorous, bear heavy crops and withstand Washington winters better than Cuthbert. In New York the variety is moderately promising, but in some years has winterkilled somewhat more than is desirable. It is satisfactory for freezing. Tahoma, also from Puyallup, is considered promising as an early sort to precede Washington in the region of its origin. It appears not to have much value in New York, being too small and soft.

Canadian Raspberries

The Central Experimental Farm at Ottawa, Canada, has recently brought out several new sorts. Rideau, an early variety, is the best of these as tested at Geneva. The berries are large, attractive, firm and of good quality. It is worthy of trial in the northern states and Canada. The other varieties, Ottawa, Gatineau, Trent and Madawaska, have shown various faults at Geneva that make them of doubtful value, but they are undoubtedly worthy of trial in the region of their origin, where the winters are considerably harsher than farther south.

Sunrise, developed by the United States Department of Agriculture, was introduced on the basis of its performance in southern New Jersey where many of the better varieties do not thrive. The statements concerning its performance in New Jersey are being used to sell plants in other regions. Unless it performs better than at Geneva, growers will be disappointed in this variety. The berries are small and inferior in flavor, while the plants are unproductive and susceptible to mosaic.

Higher Quality Fruits

Many more new small fruit varieties are on the production lines at the different stations and as their merits become evident they will be introduced for trial. Growers who follow these new varieties and test those adapted to the regions for which they are produced may expect to find some that are superior to those they are now growing. The trend is towards varieties with higher quality, better handling qualities, more attractive appearance, resistance to disease and unfavorable weather conditions. The needs of the processor, especially the freezer, and the nutritional value of the fruit are receiving major attention from the fruit breeders. The varieties of the future will be much superior to the varieties of the past because they are being made to order for specific purposes and conditions.

54320
The Diesel D2
Enters Its
8th YEAR
WITHOUT ANY
MAJOR REPAIRS"
—E. J. McManus, Milton, N. Y.

A smaller inset photograph in the bottom right corner shows another tractor, identified as a former-model gasoline Twenty-Two, pulling a 500-gallon power take-off rig.

The Tractor at left (rear) is a "Caterpillar" Diesel D2 pulling a 600-gallon power take-off sprayer; the other is a former-model gasoline Twenty-Two pulling a 500-gallon power take-off rig. Both outfits belong to E. J. McManus, Milton, New York, who has this to say—as of 1946:

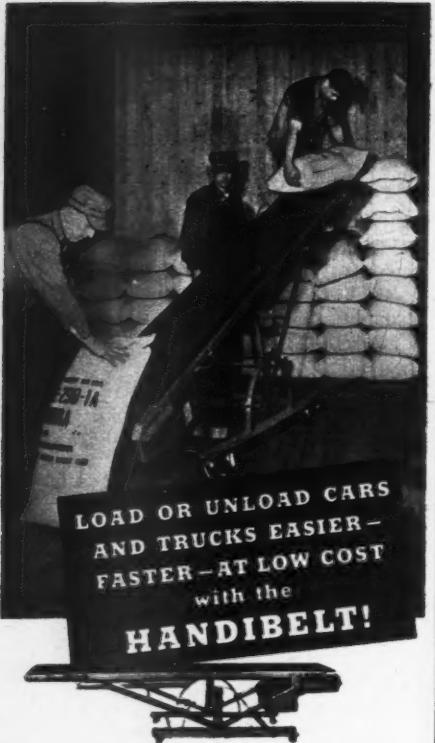
"The Diesel D2 is going into its eighth year without any major repair. The Twenty-Two is coming up eleven years old and is still a lot of tractor after having seen hard usage."

"These tractors have carried us through the war years without breakdown. In fact, I don't see how we could have farmed without them."

Whatever conditions your spray-days bring, a "Caterpillar" Diesel Tractor has the traction to pull your big power take-off sprayer on time. Plenty of these Diesels that have saved their price are still going strong!

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CHUTES - PNEUMATIC TUBE SYSTEMS**

RASPBERRY GROWING IN WASHINGTON

(Continued from page 13)

better. During most seasons, there is a relatively rain-free period in February or March during which setting can be done. It is particularly advantageous to take advantage of this early period. Plants set early become well established before the dry weather, which is not true of those set late.

Planting systems vary, but the linear system predominates. The plants are set $2\frac{1}{2}$ to 3 feet apart in rows about 8 feet apart. With the advent of modern machinery there is a tendency to space the rows farther apart. With vigorous growing varieties, 10 feet does not seem to be too far.

The Trellis

In this area red raspberries are always trained to a trellis. Ordinarily, the simpler the trellis the better. In most plantings it consists of heavy posts set about 25 feet apart in the rows. To these, two wires are stretched about 3 feet from the ground, with one wire on each side of the posts. If the posts are less than 8 to 10 inches thick, 1 x 2 inch spreaders 14 inches long are tacked on all except the end posts at the height of the wires. These are notched so the wires can be spread to 12 inches. This spreading tends to open the plants as they become loaded with fruit and at the same time permits the new canes to grow up inside the wires.

A third wire is placed a foot or 18 inches higher. Some growers like to add a double set of wires. In all instances, No. 12 wire is heavy enough.

When the hill system is used, a 2 to 3 inch split cedar stake about 7 feet long is driven in each hill. The canes are tied to the stake in two places, one near the top and the other 3 feet from the ground.

Pruning

Pruning consists of (1) removing the old canes (2) removing the weak canes, and (3) shortening the canes that are left. Some growers remove the old canes following harvest and at the same time remove some of the very small weak canes. Others prefer to leave all the pruning until February when the canes are thinned down to the desired number per hill and shortened.

Without irrigation, 6 to 8 good canes per hill seem to be about the right number. With irrigation 10 to 15 may be left. The canes are usually headed at about 5 feet. Fruit on the top laterals can still be reached by the average picker.

Systems of Training

There are two principal systems of training. Probably the most common is to simply tie the canes to the top wire. It is customary to divide the canes of each hill into two bunches and spread these about 18 inches apart as they are tied. When two top wires are used, one bunch is tied to one wire and the other bunch to the other wire.

The other system of training is what is called "weaving." When this system is used, the canes are not pruned as short as is the case with the other system. Exponents of this system contend that the best buds are in the central portion of the cane, part of which is removed in the other system. The system consists of simply weaving the ends of the canes down over the top wire and back of the canes of the adjacent hill.

Cultivation

Cultivation is one of the most exacting operations in the field. (Continued on page 36)



Raspberry field in the Puyallup Valley showing three-wire trellis system of training.

NUT GROWER NEWS

Blight Resistant Chestnuts

THE blight resistant chestnuts, being relatively early bearing trees, are beginning to prove their worth according to reports being received from various growers.

Keeping Records

A grower located on the Eastern Shore of Maryland reported in the 1944 report of the Association a crop record of his 19 Chinese chestnut trees, *Castanea mollissima*, which were planted in the year 1930, and which began to bear before 1937, but from 1937 on he kept a bearing record of each tree. The total crop in 1937 was 118.75 lbs., with an increase in crop each year except two, to 1943, in which year the crop was 749.50 lbs. In 1944 the crop was less, due to hurricane loss, but even with that loss, the crop weighed 678 lbs. This grower has well demonstrated the value of keeping accurate records on bearing and performance of new crop trees.

Stock Available

Chestnuts generally require good drainage on heavy soils, with pH requirements at about neutral. Several varieties of blight resistant chestnuts are now available from nurserymen specializing in nut tree production and are offered under variety names; some nurserymen are also growing seedlings from isolated good trees.

Plantings for crop purposes should be made where strict sanitation methods can be carried out in order to keep the nut crop free of weevil. It has been reported that where chestnut trees are planted in the chicken yard, a clean crop is insured because chickens readily eat any weevil which falls to the ground, thus ending the breeding cycle of this pest. Religiously gathering the nuts as soon as they fall and storing them in bags destroying any weevil which may emerge, will also keep the weevil from entering the soil and perpetuating their species.

Annual Report

Correspondence relative to nut tree problems is invited. The 35th annual report of the N.N.G.A. (1944) is available from the secretary at \$1.00 postpaid. A list of nut tree nurserymen is also available free.—*Mildred M. Jones, Sec'y, Northern Nut Growers' Association, P. O. Box 356, Lancaster, Penna.*

APRIL, 1946

A Marketing Program To Help Agriculture Shift From War To Peace



EVERY segment of our national economy is concerned now with the shift from war to peace.

The degree of success of these national groups in developing a sound financial, industrial and business program will directly affect agriculture because of the common economic interdependence of each. Nevertheless, agriculture's own future, in large measure, will be determined by how well producers, distributors and allied interests discharge their twofold responsibility:

1. Adequate production.
2. Sound marketing.

The production record of the war years clearly demonstrates the ability of the American farmer to furnish an adequate supply of food. With the return of peace and the removal of war handicaps—shortages of manpower, farm machinery and equipment—the productive capacity will be greatly increased.

With adequate production assured, agriculture's most pressing problem, in addition to maintaining low production costs, is, and will be, efficient distribution.

Agricultural leaders have long recognized the need for a better marketing program to accomplish the following objectives:

1. To maintain the original quality and freshness of agricultural products for consumers.
 2. To keep damage and waste at the minimum.
 3. To eliminate unnecessary distribution costs, and to reduce all costs to the fullest extent.
- The most hopeful development of late years has been the cooperation of farmers, the Federal and State Departments of
4. Improving and standardizing grade and pack.
 5. Developing better transportation methods by truck, train and plane.
 6. Using scientific refrigeration at every stage of marketing, when required.
 7. Routing produce more directly from field to retail outlets.
 8. Merchandising more mature products.
 9. Developing new by-product uses for inferior grades.
 10. Improving retail merchandising through better display, advertising, handling and selling.

Teamwork made America invincible in war. This same unselfish teamwork by those who have the responsibility for food production and marketing will help agriculture more successfully to shift from war to peace.

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Falls Tree, Cuts Log
Uses Power Take-off any tractor. Saws fast. Easy on fuel. Thousands of satisfied users. Big labor saver. Low price. FREE BOOK & PRICE LIST.
OTTAWA MFG. CO. D-432 Forest Ave. Ottawa, Kas.

RASPBERRY GROWING IN WASHINGTON

(Continued from page 34)

ing operations. There is an abundance of soil moisture during the fall, winter and spring, but without irrigation it becomes scarce in the summer. No effort is spared in keeping weeds from depleting the moisture supply in the summer. Weed eradication starts in April or early May. With a plow running about 2 inches deep, a furrow or two of dirt is thrown to the row from each side. This dirt completely covers and smothers the weeds in the row. The dirt is worked away in later cultivations. No one questions the importance of keeping the ground free of weeds during the summer in non-irrigated plantings. All agree that this must be done. There has been some difference of opinion as to how deep to cultivate. It is generally believed that shallow cultivation is best because it permits the feeder roots to utilize the top soil which is not the case with deep cultivation. Mr. Jack Wildberger, Everson, Washington, demonstrated to his own satisfaction at least that shallow cultivation is the thing. This year he held his cultivation to about 2 inches and his planting looks better than it did during seasons of deep cultivation.

Washington raspberry growers find that it is not enough to choose good land. The soil must be kept fertile and in good physical condition. Growing green manure crops of vetch and rye supplemented with commercial fertilizers high in nitrogen and phosphorus is fairly common practice. The green manure crop sown in September before fall rains start, prevents the loss of plant food by leaching and adds organic matter as well. By mid-April in the southern parts of the state to mid-May in the northern part, when it must be disked in to avoid depleting the summer moisture supply, it is one to three feet high.

Varieties

For years, Cuthbert has been the standard variety. With its high quality and high productivity, it has established an enviable reputation for itself. Unfortunately, it has two major weaknesses. It is susceptible to winter injury and to raspberry Mosaic. The winter temperatures of this area seldom reach zero, but the plants often start considerable growth in the fall. During some seasons, the laterals make several inches growth in the fall. Canes in this condition obviously are injured by even mild winters. Ever since the introduction of the Cuthbert in this area, its lack of hardiness has been a serious hazard.

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Mosaic has been a serious factor, but were it not for winter injury, the plantings could be kept in fairly good condition by roguing. When the disease first got a foothold in this area, regular programs were carried out by the Extension Service of the Washington State College. These proved to be very effective. Mosaic rogues such as County Agent A. M. Richardson of Tacoma, became so expert that he could pick out a diseased plant almost as far as he could see it.

Breeding Program

Scientists of the State College of Washington saw the handwriting on the wall. There seemed to be no way of overcoming winter injury, and mosaic under the best of conditions was bound to cause some loss. These two factors, they saw were cutting the raspberry growers out of something over half a million dollars each year. To prevent this loss, they set out on a breeding program. To retain the high quality of Cuthbert, this variety was used as a parent in much of the breeding work. In the course of a few years, one plant in a Cuthbert-Lloyd George cross stood out above others. It had the same good quality of Cuthbert with some outstanding advantages. It was considerably more hardy than Cuthbert and much more resistant to mosaic. It also stood up in freezing and canning tests. With these characteristics, the new development was considered worthy of introduction as a new variety. Dr. C. D. Schwartze, Horticulturist, Western Washington Experiment Station, Puyallup, where the breeding work was done, and his associates introduced it and called it Washington.

Today, Washington is the dominating variety of red raspberry in Washington. It is being planted in central and eastern Washington, as well as on the coast. Dr. Schwartze has many other promising developments, some of which may prove to be superior to Cuthbert.

While Washington predominates, there are plantings of such varieties as Marlboro, Tahoma, Williamette, Lloyd George, Newburg, Taylor and Latham. Latham, which is going out fast, is confined to eastern Washington and Newburg and Taylor are seldom found on the coast.

In Washington, boysenberries, youngberries and similar dewberry sorts are confined mainly to home gardens. They seem to be a little too tender to be as dependable as more hardy crops, such as raspberries. Their superb flavor has induced a few growers to grow them commercially even at the risk of serious winter injury setbacks. During favorable seasons, the crops are quite satisfactory.

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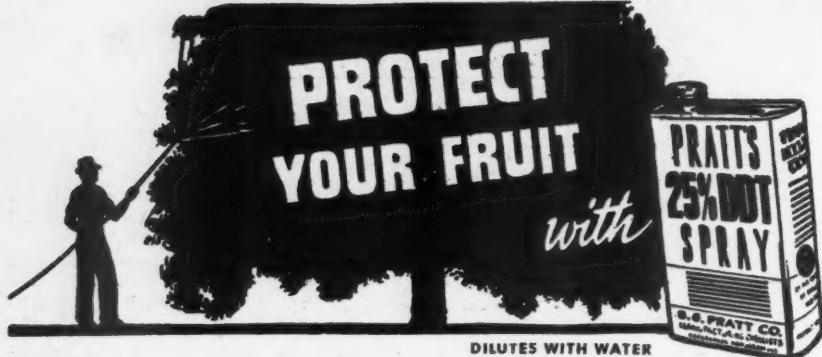
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And Sam has another trade mark, too: the glass of beer he buys his client after every deal is settled. Sure, it's a friendly gesture . . . but more than that, it reminds Sam's clients that he's a man of moderation and good taste—dependable and temperate. Sam's no fool!

Joe Marsh

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INSECTS AND DISEASES

(Continued from page 15)

causing early spring stunting and wilting and dying of older leaves, and later in season a rotting of rootlets, with an internal red coloration emanating from the rotted portions. Once established in a field there is no control save the use of resistant varieties (Temple, Aberdeen, etc.). Infested ground should not be planted to strawberries. Only plants certified free of red stele should be used.

Crown borer: The boring of this weevil into the crown causes formation of sucker crowns, stunted plants, and a reddening of the upper leaf surfaces. In cases of light infection, roguing may control. Heavily infested plantings should be destroyed.

Leaf roller: Small green or brown caterpillars bind the two halves of leaflets together with silvery webs. Moderate infestations can be checked by a lead arsenate 3-100 spray applied as soon as injury is noted. Heavily infested plants should be mowed and the trash burned.

Spittle bugs: In early spring small green insects with frothy-white coverings distort leaves with their sucking, and may cause berries to become small and seedy. Control is obtained with a 0.5% rotenone-containing dust applied when froth is first noticed, and then once again 10 days later.

White grubs: Sudden wilting of plants may be caused by root-feeding of the large grubs of the June beetle. Short rotations with beans, peas, or grain preceding strawberries will lessen attacks. One part lead arsenate and 20 parts fine dry sand applied at rate of 1½ ounces around the roots has given good protection.

The following publications will present the reader with much additional information concerning the diseases and insects mentioned as well as many others. These bulletins are but a few of the many helpful ones distributed by the various state agricultural experiment stations and the U. S. Department of Agriculture.

Demaree, *Diseases of strawberries*. Farmers' Bul. 1891. U. S. Dept. Agriculture, Washington, D. C.

Dodge and Wilcox, *Diseases of raspberries and blackberries*. Farmers' Bul. 1488. U. S. Dept. Agriculture, Washington, D. C.

Jones and Smith, *Control of small fruit diseases and insects*. Ext. Bul. 180. State College of Washington, Pullman, Washington.

Mills and Evans, *Diseases and insects of small fruits*. Ext. Bul. 306. N.Y. State College of Agriculture, Ithaca, New York.

Rasmussen, Hutson, and Cation, *Spraying calendar*. Ext. Bul. 154. Michigan State College, E. Lansing, Michigan.

Smith, *Diseases of fruits and nuts*. Circ. 120. College of Agriculture, Berkeley, California.

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BREEDING SMALL FRUITS

(Continued from page 16)

could increase the certainty and efficiency of his work if he could obtain parents that would tend to breed true for a few very desirable qualities! Fortunately a way is known.

The method of developing such parents is through inbreeding, by a process known as selection in artificially self-fertilized lines. This method is, of course, the one that has been applied so successfully to corn in developing the so-called hybrid corn varieties, which have greatly increased the production of that crop in recent years.

Breeding strawberries by this method was begun on a small scale at the Minnesota Agricultural Experiment Station late in 1922 and later was considerably extended. Some of the lines developed in this project have been selfed for four generations. A number have been used with encouraging results in crosses. About 150 of the inbred selections are now carried on hand. Most of these are superior for their breeding value with respect to certain desirable qualities such as hardiness, vigor, productivity, attractiveness of fruit, or leaf-spot resistance.

The objection is commonly raised that inbreeding results in loss of vigor, so that inbred lines of the fruits become difficult or even impossible to maintain. Most of the selections now on hand in the Minnesota project, however, are maintained without difficulty.

The inbreeding method requires several generations for completion, but through the development of superior breeding lines it lays the foundation for more effective crossing. This method also presents other important advantages. One, which may deserve emphasis as a principle of breeding, is that in this way it may be possible to isolate from a variety certain characters not known to exist in that variety. Thus disease resistance may be, and actually has been, isolated from so-called susceptible varieties.

Although this method of breeding may be somewhat more difficult with raspberries, there are indications that it may also have important possibilities with this crop.

In the United States and Canada, a great deal of breeding work is under way with small fruits. Progress is being made, for example, in developing hardier raspberries and strawberries for the North, raspberries that will thrive in the South, blueberries with better fruit for the South, and cranberries that are less subject to dis-

(Continued on page 40)

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The latter is a national trade association of manufacturers of sprays, dusts and other materials for protecting orchard and farm crops against insects and plant diseases. Its headquarters is in New York at 285 Madison Avenue.

Mr. Leonard succeeds Joseph B. Cary, president of Niagara Sprayer and Chemical Company of Middleport, New York. The change was made by a board of directors meeting, Mr. Cary retiring from the presidency because of pressure of other business. He was serving his fourth year in that post.

BREEDING FRUITS

(Continued from page 39)

ease. There are many problems, however, on which work has scarcely begun. The seriousness of virus diseases of raspberries, particularly the blacks, offers a challenge to the best efforts of breeders cooperating with plant pathologists and entomologists. Blackberry breeding is in its infancy. Gooseberry breeding is needed to develop mildew-resistant varieties with superior fruit. In fact, the field is five feet deep with problems that can be attacked through breeding.

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From the pages of this book, the fruit grower will gain an understanding of the relationships between the laws of nature and the growth of plants. From germinating seeds to the complex life processes of mature plants, the dynamic story of plant growth can be followed. This is an excellent book for every fruit grower's library.

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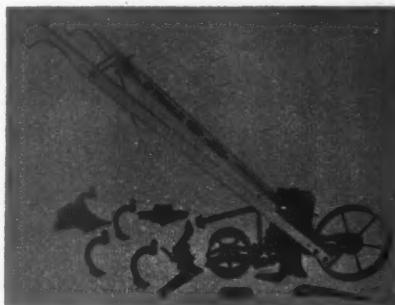


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NATIONWIDE FRUITS

(Continued from page 19)

As described recently in a technical article by Karl D. Brase, rootstock specialist at the Station, the answer seems to be found in grafting the desired variety on Mahaleb seedlings which have attained a height of about 26 inches before grafting. In this way the Mahaleb forms the root and body stock while the desired variety makes the top of the tree, with the Mahaleb body stock exercising a decided dwarfing effect.

The Giant sweet cherry and the Montmorency sour cherry have been tried out in tests on the Station grounds since 1940 and have made faultless unions with the Mahaleb body stock, says Mr. Brase.

In commercial nursery practice cherries are budded on the rootstock just above the soil surface and there is no dwarfing effect, at least in the early years of trees grown on Mahaleb roots. Where Mahaleb is also used as the body stock, however, the growth of the top is so restricted that the resulting tree is much dwarfed and compares favorably in size with dwarf apple trees.

All trees planted in 1940 on Mahaleb body stock bore some fruit the third season from planting, states Mr. Brase, with a slight increase in fruiting observable in the fourth and fifth seasons. Further observations on the growth behavior of the trees are needed, however, before final conclusions can be drawn regarding this method of producing dwarf cherry trees.

STATE NEWS

(Continued from page 26)

continue at or near that high level, grove sale prices would move still higher—and justifiably so, but grove income is not expected to remain long at its present level.

Because grove values are far in excess of normal, Mr. Savage thinks extreme care should be exercised before purchasing a grove at high prices even if cash is paid, and doubly so if it is necessary to go into debt to buy it.

OHIO SPRAY SERVICE

THE Ohio fruit spray service radio broadcasts, including information relative to timing of sprays for fruit disease and insect control, began over Radio Station WLW, Cincinnati on March 25th. Broadcasts over this station may be heard at 6:50 a. m. Mondays, Wednesdays and Fridays.

The same service may be obtained each Tuesday, Thursday and Saturday at 12 Noon by listening to Radio Station WOSU, Columbus. The WOSU series began March 28th.

Radio Station WTAM, Cleveland, will carry these broadcasts each Tuesday, Thursday and Saturday at 6:35 a. m., beginning April 9.

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Have plenty of fruit to eat and sell this year. NEW STREAMLINER everbearing strawberry. Price 25 for \$2.50; 50 for \$4.50; 100 for \$7.00; 250 for \$15.00. EVER-BEARING Red Raspberries. Price 25 for \$3.00; 100 for \$10.00. Will bear fruit this year. ORDER NOW. CATALOG FREE.

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Ramblings OF A HORTICULTURIST

Horticultural Cycles

HORTICULTURE appears to go in cycles like most everything else. Some of you will recall the county and community horticultural meetings of your younger days. How the farmers and fruit growers loved to exhibit their apples, peaches and other fruits in season at the monthly meetings. The grower who could exhibit the finest apple, peach or other fruit was regarded as the gentleman of the community and was respected for his knowledge of different varieties. You might call this period the age of varieties. It was during the early part of this period that the American Pomological Society came into existence in 1848.

The turn of the century saw the advent of spraying. So we may call that the beginning of the spraying age. We can place no definite limits or dates on these ages, but spraying has assumed more and more importance since 1900. Many developments and changes have taken place in the last half century which have caused some aspect of spraying to dominate the programs of horticultural meetings. Recently a horticulturist and fruit grower remarked to me, "When are we going to get rid of this spraying and codling moth curse on fruit growing and really get back to talking about real horticulture at our meetings?" Now with the arrival of rather spectacular new insecticides and fungicides, perhaps we can give the old orchard "bugs" a couple of shots of this and that and turn our attention to some of the other perplexing problems of horticulture.

Perhaps we are at the turn of another age in horticulture. What it shall be would be only the wildest of a guess. From what we are learning about certain plant hormones or growth regulating substances, we could project that the next horticultural age may be the one of plant growth control. At least some of the most phenomenal scientific work is being done within the realm of regulating plant growth and flowering by the use of certain chemicals.

Already some experiments indicate that we may be able to control the date of blooming of peaches and apples by applying a spray of growth chemical



Some of you will recall the community horticultural meetings of your younger days. How the farmers and fruit growers loved to exhibit their apples, peaches and other fruits in season at the monthly meetings. The grower who could exhibit the finest apple, peach or other fruit was regarded as the gentleman of the community.

at the critical time of flower bud formation. Other of these chemicals are finding use in weed control. So it looks like we are in for some really interesting developments in this next age of horticulture, whatever we may call it.

Of course I don't mean to say that our horticulturists are going to leave us out in the cold on other problems of fruit growing; they will keep us well informed on these too. For instance, in addition to the developments in spray materials, we are seeing similar spectacular changes in sprayer design. The Speedsprayer was perhaps the first significant departure from the conventional power sprayer. Of course the duster is another development of fungicide application almost as old as the power sprayer. Now we are witnessing changes designed to improve upon the first Speedsprayer. The use of the fog machine to lay down smoke screens during the war has prompted some to try it as an efficient means of spray application.

So you see, we might even be embarking on an era of great develop-

ments in methods of spray application. Some of the newer materials lend themselves to these improved methods of application more readily than the older types.

We are also just beginning to tap the facts about storage of fruits. The developments within this realm may change our methods of marketing, at least to some extent.

Air transportation of fruits now looms on the horizon as a field completely untouched. Should cargoes of fruits be shipped across the country in large flying boxcars, we might have to revamp our variety picture, marketing system and even fruit producing areas. Our knowledge is accumulating about the economic factors of marketing fruits. We are trying new types of containers that will place tree-ripened fruits in the hands of the consumer. Plant breeders are constantly studying nature's ways and are presenting new and better varieties for our use.

We could just go on here for hours, pointing out great scientific developments in horticulture. But you get the idea.

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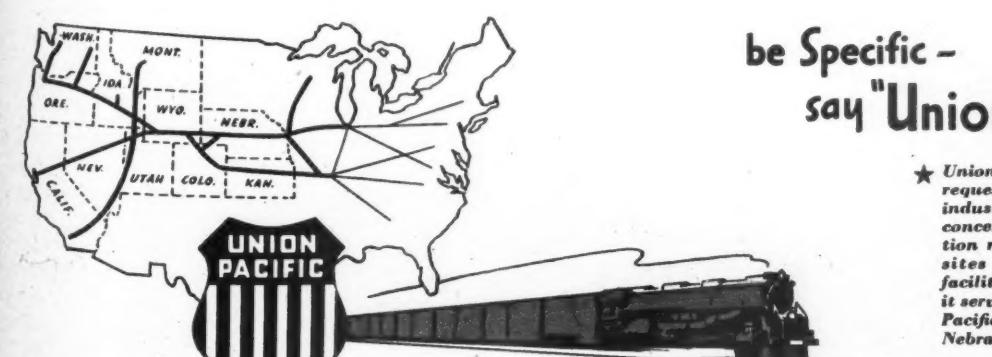
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The Progressive

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EDITORIAL PAGE



E. G. K. MEISTER
Publisher

J. H. GOURLEY
Associate Editor

More Bees Are Needed

THE COLONIES of bees in this country should be increased by 8 percent. This is a proposal included in this year's Goals Program by the U. S. Department of Agriculture, and it is a necessary measure to aid in providing more adequate pollination of fruits and vegetables and legume forage crops.

The activity of the bees as pollinating agents is considered to have a value conservatively estimated at 10 to 20 times the value of the honey and beeswax they produce. Bumblebees and other former pollinating insects have been decreasing rapidly as a result of poisonous sprays and dusts, and from the clean cultivation that has destroyed many of their homes—thus placing a greater pollinating burden on the honeybees. At least 50 crops depend upon bees for pollination or yield more abundantly when bees are working.

The proposed goal of 8 percent increase in the number of colonies of bees has been broken down by the Department into a specific goal figure for each State, according to its individual needs for building up legume seed production, fruit output, etc. For effective economy, most States should have even more colonies of bees than the proposed goals.

The Best in Radio

A DEVELOPMENT in radio broadcasting was established in 1940 as a new service and termed FM, meaning "Frequency Modulation". In the language of radio listeners, the letters FM mean elimination of static and interference. Among many other reasons, this is important when one is trying to hear the daily spray message over the radio.

In 1940 the Federal Communications Commission, FCC, assigned FM broadcasting to the 50 megacycle region band of frequencies.

The better "listening conditions" led to rapid growth of this type of broadcasting until the war halted it. But all through the war years, the 47 FM broadcasting stations that had been established rendered unparalleled service.

A good FM station broadcasting on the 50 megacycle band has a good receiving range of from 80 to 100 miles or even more. Even during a crashing thunderstorm, a farmer with an FM receiving set within range of his station could pick up the broadcast without interference.

Now the FCC has ruled that FM broadcasting stations will have to operate in the 100 megacycle band of frequencies. Tests have proven that the range of effective broadcasting in this band of frequencies is about half that of the former. In effect, the ruling bars farm people from the improved and refined method of broadcasting, as well as making useless the FM receiving sets already in use.

There is no group in the country that depends upon the radio more than do rural people. Why must the FCC and monopolistic interests bar them from the best there is in radio?

International Horticulture

SCIENCE HAS NEVER known national boundaries, except perhaps as those applied to the tools of war. The fact that the United States and Russia are exchanging different fruit varieties for experimental purposes is evidence that fundamental research is still international in scope.

From the orchards on the grounds of the State Experiment Station at Geneva, New York, there have been collected and shipped to Moscow, Russia, 2,704 cions of 170 varieties of fruits. These cions are going to experiment stations in the Ukraine and northern sections of the U.S.S.R. for reestablishment of orchards destroyed during the war. Of the 170 varieties consigned from the Geneva Station were 74 apples, 27 plums, 22 peaches, 21 pears, 8 grapes and 18 cherries.

The Russian experiment stations in return are sending to the Geneva, New York Station, cuttings from a number of fruit varieties native to their own localities. Among them will be cions from hardy apples, grapes, plums and peaches.

The Russian varieties will be grown in the Experiment Station orchards and compared to our native varieties in culture, production, quality and resistance to diseases, insects and winter injury. Most important, perhaps, will be their value as parents in breeding new and better fruit varieties.

Seeds

SEEDS are the most remarkable bundles of living plant tissue we have. Their potentialities are out of all proportion to their small size and their insignificant appearance.

What is a seed? Seeds may be a number of things but essentially a seed is an embryo plant. In addition, a seed often has a supply of food stored nearby in the same structure, and when favorable conditions arise this young undeveloped plant draws on the supply of stored foods and starts its development into the same sort of plant from which it came.

Some seeds are just dry fruits and the seed may be only a part of the entire structure. The seed of the peach is just the kernel inside the hard "stone," the stone being the innermost part of the fruit. The grains of wheat and oats are also more than just the seed, for they both contain other plant parts.

The great range in size of seeds is one of their most amazing features. Orchid seed is so small and so delicate that it is treated much like a culture of bacteria, being grown in sterile agar for six months or more before being strong enough to withstand the "rigors" of climate found in well-run greenhouses. On the other hand, the coconut seed may be a foot or more in length and almost indestructible as a block of wood.

Some seeds can withstand most extreme conditions and survive without apparent damage. It is possible for "seeds" of the raspberry to be boiled for a considerable period of time in the process of jam making without destroying their ability to grow into new plants. On the other hand some seeds can withstand a temperature of four hundred and fifty degrees below freezing for a period of six hours without being frozen to death.

Seeds may die within a short time after they mature, or they may live to a great age. Willow seeds may lose their ability to germinate in a week or less, while the seeds of the Lotus plant were found to be capable of germination even when their known age was approximately 150 years. Between these two extremes lie the endless variability that is so characteristic of the plant world.

Seeds are so important in the agriculture of the world that their importance hardly needs to be pointed out to the orchardist. Their variability and their peculiarities make necessary a careful scrutiny of seeds, and they have been extensively studied. As in other fields, the study has hardly begun as yet and many new and interesting facts are continually being discovered concerning this remarkable plant part.

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